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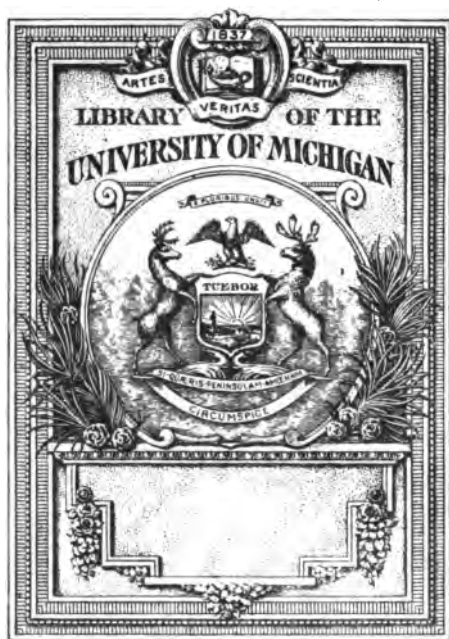
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**S.O.S.: AMERICA'S MIRACLE IN FRANCE**

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10



GENERAL JOHN J. PERSHING  
*Commander-in-Chief of the A. E. F.*

# S. O. S.

AMERICA'S MIRACLE IN FRANCE

BY  
ISAAC F. MARCOSSON

AUTHOR OF  
"THE BUSINESS OF WAR,"  
"THE REBIRTH OF RUSSIA,"  
"THE WAR AFTER THE WAR,"  
ETC.

WITH FIFTEEN ILLUSTRATIONS  
FROM PHOTOGRAPHS

NEW YORK: JOHN LANE COMPANY  
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TO  
GENERAL JOHN J. PERSHING  
SOLDIER, DIPLOMAT, ADMINISTRATOR

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## FOREWORD

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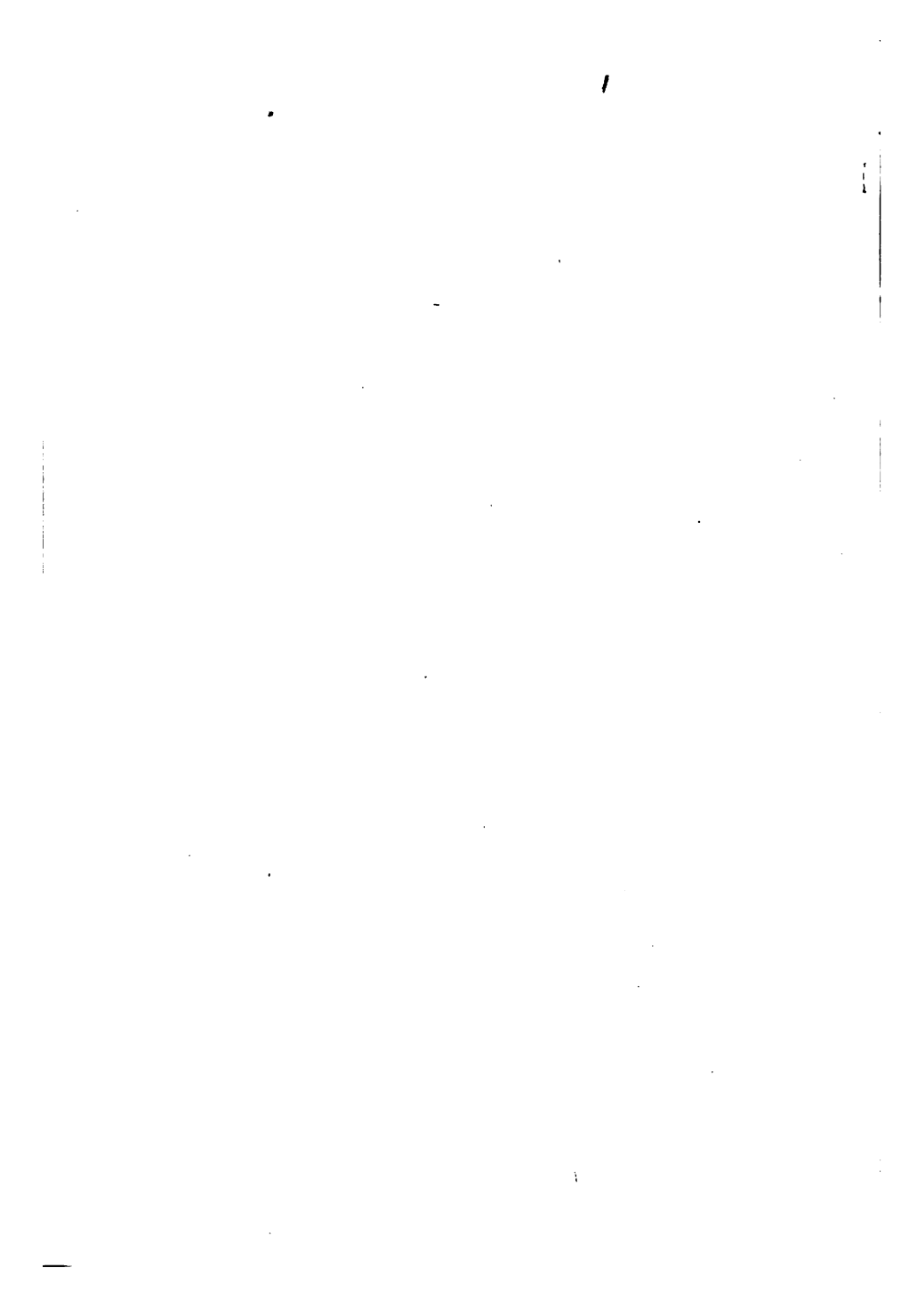
**T**HIS book was written in France—often within sound of the guns—as a tribute to the unsung heroes of Supply and Transport. Many were above military age; most of them left congenial jobs to do their part in a task which was both stern and unspectacular. Far from the firing line which they longed to join, and amid the dust of traffic, the din of docks, and the hot confines of an office, they contributed vitally to the achievement of the American Expeditionary Force.

Their work discloses an unselfish and uncomplaining effort that will rank with the glories of Chateau-Thierry, St. Mihiel and Sedan. More than this it proves that the genius of American organisation was no less effective in war than in peace. The lessons of efficiency learned under the stress of necessity overseas should now be capitalised in the vast Drama of Reconstruction at home.

To those gallant men of the A.E.F. from the Commander-in-Chief down, I desire to express my grateful appreciation of a co-operation and a comradeship that made my work a pleasure and a privilege.

I. F. M.

New York, January, 1919.



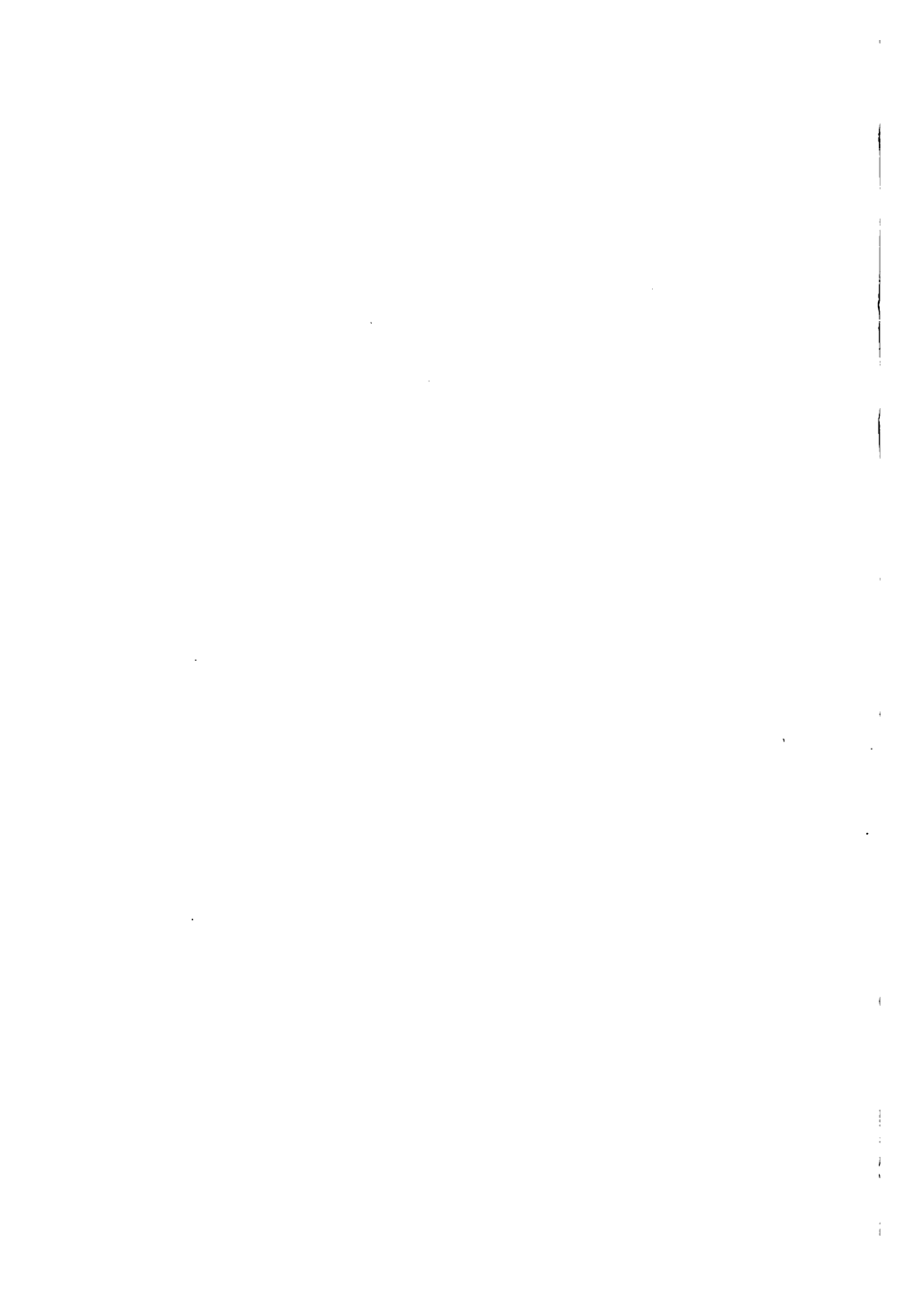
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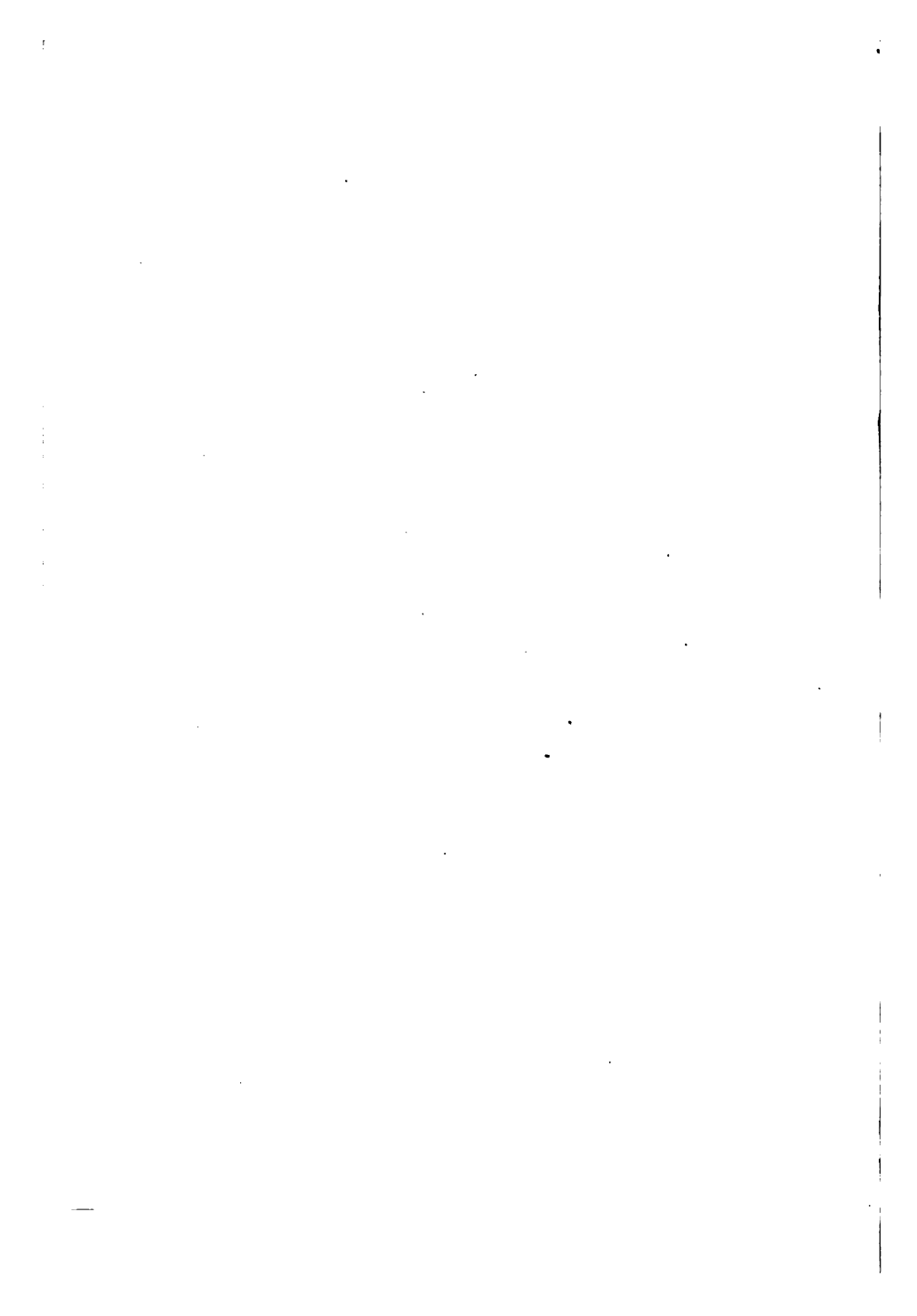


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**S.O.S.: AMERICA'S MIRACLE IN FRANCE**

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## I—*The Birth of the S. O. S.*

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THE boom of American cannon echoed beyond the Meuse; machine guns sputtered wickedly to the right and left; overhead Liberty motors hummed as the aeroplanes returned from their evening reconnaissance; down the dark paths to the trenches troops marched to the rattle of equipment. All around was the deadly din of war—the unfailing music of the supreme world drama. America was on the frontiers of the Great Redemption.

Behind that fighting front stretches another battle-line that reaches from those perilous posts of freedom four hundred miles down to the sea and then three thousand miles beyond to the shores of the United States. About it is no glamour of stirring spectacle; no scene of actual combat. Yet day and night and with ceaseless and heroic endeavour it feeds and supplies the battling hosts. Instead of mustard gas it breathes the choking dust of teeming highways; in place of open shot and bursting shell it faces the hidden hazard of the submarine. Bending beneath the burden of a tonnage that is one of the wonders of the war, it maintains the insurance against a disaster more destructive than Hun advance. For mouth and guns must be fed and fighters clothed and carried.

We thrilled at the narrative of Château-Thierry and St. Mihiel, yet every twenty-four hours since we have had an army of any size in France these legions of transport and subsistence, combating wind, rain and every obstacle that war-fare in a foreign land imposes, have registered an achievement fit to rank with that high heroism. Their gallantries have been recorded in the tangle of railroad yards, in the gloom of warehouses, amid the glare of sun-scorched quays, or the prosaic routine of repair shops. For them there are few medals of merit; only the consciousness that without their unsung service of the rear there would be no brilliant offensive at the front.

This army behind the army is the first to land; the last to leave. In his eager search for the smell of powder sightseer and historian pass it by. Nor is it surprising. In the thrall of battle tumult the world loses sight of the mechanics of war. It is easier to have an emotion about a forlorn hope led to victory than about a food supply column that reached the line under a storm of shrapnel. Yet the courage of the teamsters who faced death with only the reins in their hands is full mate to the valour of the fighting men armed with rifles.

From France this past year has come a flood of writing about the fighting doughboy and his doings. The boy who supplies the doughboy has, in the main, escaped the spot-light. Yet he is part of an intricate organisation that has solved, so far as supply and transport are concerned, the most stupendous military problem in all history. For every soldier that

we land in France we must also land fifty pounds of supplies and equipment every day. Most of it comes across three thousand miles of submarine-infested sea. Each aeroplane that we assemble over there needs forty men for upkeep. Our motor transport service alone requires sixty thousand different kinds of spare parts. To guard against a break-down in ocean communication we are compelled to keep and do keep a ninety days' reserve of food and fuel on the Continent. We have more than two million troops in France and the number increases daily. A ship loaded with soldiers or supplies leaves an American port for France every fifteen minutes. An avalanche of men and munitions literally beats upon the shores of our sister republic. We originally planned for an expeditionary force of 500,000 men; the scheme has been expanded five times until we now march to a goal of 4,000,000. These men and their supplies must be adapted to a shifting scheme of combat or subsistence the moment they arrive. How have we kept pace with this stupendous and incessant activity and at the same time avoided a congestion that in twenty-four hours would be fatal to an adequate participation in the war? What is the system that has been proof against every handicap that enemy cunning, aided by geography, could set up?

Search for the reply and a master chapter in the story of the American effort in France is bared. It is an epic of action aglow with faith and rich with the sacrifice of men who, eager to rise up and fight, buckle down to drudgery that has no thrills. They

wrestle with figures, pore over charts, pound typewriters, drive trucks, unload ships and build docks and railways in order that their more fortunate brothers may have a fling at glory. This romance of America transplanted is as stirring as any battle biography.

I have touched it at every point. For weeks I followed the trail of tins and transport from dock to trench, I lived in the turmoil of ports, dug into diagrams, saw this whole panorama of supply pass in deafening and well-nigh bewildering review. When you have watched it you realise why the American soldier has not missed a meal or lacked the wherewithal to fight ever since he has been abroad. It took blood and sweat and agony to produce the goods, but they have always been delivered. The fifty millions that we spend every day for war are not wasted.

Likewise you understand how, when Paris sat imperilled last July, General Pershing could swing a well-equipped and well-supplied army into the line almost overnight and help stem the tide at that historic stream where once before civilisation trembled for its fate. It was not accident or luck that added Château-Thierry to the lustre of American arms. It was because the American overseas machine that feeds the fighting man was so well constructed and so mobile that it responded swiftly and efficiently to the first emergency call. Here was revealed and in kindling fashion the initial phase of the mighty miracle that has transformed a disorganised democracy into a formidable military power.

I have no illusions about army organisation. For three years I have ranged that flaming battle line that once began in the snowy Caucasus and ends at last in the blue waters of the Adriatic. In that time I have seen many millions of men under every condition of modern combat and commiseration. "The lives they led were mine." Thus it came about in the troubled course of war events that after all this wandering amid alien armies and under foreign flags I came at last to my own people to find the supreme supply achievement of the struggle.

It is no depreciation of any of the army organisations that I have described to say that the American Business of War as expressed in the Service of Supply (the "S. O. S." they call it for short) is the most remarkable performance of the kind that I have yet seen. Those magic letters which, flashed by wireless, spell distress at sea, mean first aid to the fighting American in France. Dwell under their Standard and you feel that they may also stand for the Spirit of Sacrifice!

Do not get the idea that we have reached perfection. You cannot construct a Panama Canal over night and fail to find a few raw spots at dawn. We are not standardised, for example, like the British or the French. But England and France have reached the limit of their war strength; they have been going war concerns for over four years. Our troops and supplies, on the other hand, are in a constant race across the Atlantic. We serve as we build. Hence in the magnitude of our operations, in the difficulties

that eternally beset us, and in the far-flung and galvanic energy that animates us, we stand alone. The impetuosity of the American soldier, one of his outstanding qualities, obtains with ration as with rifle.

The proverbial desert that suddenly bloomed like a garden has nothing on the A. E. F. By one of the curious paradoxes of war we create and consume at the same time. A warehouse is filled before it is roofed; giant cranes swing cargoes from ships while they are being berthed; the cow-catchers of American locomotives press on the heels of the track construction gangs. The supply city of to-day is unrecognisable in a fortnight because it grows so fast. We have turned farms into factories; converted swamps into swarming communities. We reclaim men just as we salvage guns. We have laid down and operate a series of railways equal in scope to the Pennsylvania system; we feed and supply a population almost as large as that of St. Louis; we have erected a cold storage plant that would supply every citizen in Greater New York, London, Paris and Chicago with fresh meat for twenty-four hours; somewhere in France we have established a motor principality that is a small replica of Detroit. Co-ordinating this universe of effort is a system of control and administration, linked up with every scientific aid to modern commerce, that would run a hundred United States Steel Corporations all rolled into one. Even the horses have identity discs! Quantity output, which dramatises the genius of the American Industry of Peace,

is duplicated in this new American Business of War, Unlimited!

Every real American is a shareholder in this giant enterprise. Its bank is the Liberty Bond; its balance sheet the roll of our national honour; its perpetual dividend will be peace and security in the days to come.

The spirit of that Overseas America which changed Allied depression into defiance in the crucial hour of the war is after all the same pioneer spirit that conquered the prairies and won the West. It animated Lincoln and Lee and Grant and is to-day reincarnated in the character and purpose of Pershing and the working and fighting host he leads. In this war-born faith which finds one expression in the Services of Supply lies the hope of the New America, which, re-created in the crucible of conflict, will be a factor in the rehabilitation of the world.

You cannot understand the immense operation which daily pumps and provides the life blood of the A. E. F. without knowing the approach to that historic day when our troops first set foot on France. It explains many things, most of all the colossal difficulties under which our supply system was launched.

As most people know, Marshal Joffre went to America soon after we declared war and pleaded for immediate assistance. It is no secret that the French morale had wavered slightly under three years of incessant hammering. Human endurance, heroic as it was, had almost reached the limit of its powers. The hero of the first battle of the Marne said in

substance: "Send us troops at once. You must make a beginning no matter how small." This procedure was against our better judgment, which dictated delay until we could come in force. Besides the way had to be prepared. But France's need was urgent.

It followed that almost before the United States realised that it had gone to war our First Expeditionary Force—the immortal prototype of Britain's gallant "First Seven Divisions," steamed unheralded into St. Nazaire on a June day in 1917 that will be forever famous. So far as the tools of supply and transport were concerned, that vanguard of the new armies of democracy had practically nothing but its bare hands, and with these implements it set to work. The spade had to precede the crusade. Bread was necessary before bullets. The first scene in the vast drama of our actual participation therefore discloses that handful of men in khaki digging, grubbing and building, and it has kept up ever since on a constantly increasing scale.

At the start the two principal problems were revealed. One was labour; the other was tonnage. This is why our little army could not join the battle line at once. It discarded the rifle for the pick; the engineers who came out to plan trenches, military railways, and fortifications had to enlarge docks, build berths and erect bakeries.

Now began the chorus of European criticism which was not without its echoes back home. Those of us who travelled back and forth from Europe in those trying days got it on all sides. "Why is America



so slow? Why can't a nation of a hundred millions get an army into the field?" was the refrain.

These people who jeered and criticised little knew the price in sweat and sacrifice that our outposts in France were paying for unreadiness. But if the nation was unprepared the individual was not. It is the triumph of this dauntless individualism, now welded into an organised and close-knit whole, that has made the achievement of the A. E. F. possible. Nowhere is it more strikingly apparent than in the development of the Services of Supply.

But while those intrepid outposts whose picks and derricks registered a courage not surpassed on the firing line, worked and worried, help was on the way. During the heart-breaking autumn of 1917 the labour battalions began to arrive. The plantation darkey from Alabama suddenly found himself working alongside a Chinese coolie on a French dock piled with American supplies. We began to annex ports; our engineers burrowed into the rich soil of France; acres of machinery sprawled about in apparent confusion. Still the plaint was "Why so slow?"

Then the miracle happened. Almost overnight the visible structure of a vast supply system appeared. Out of the mire rose quays; in the waste places warehouses broke like magic; American locomotives seemingly sprang from the ground as the fabled knights of old leaped from the planted dragons' teeth. The French blinked their eyes; our British cousins stood speechless. But to the American it represented no witchery or necromancy. Accustomed to see a gaping

busy hole in the midst of a city block give forth a steel skyscraper almost overnight he knew that Yankee construction history, animated by stupendous hustle, was simply repeating itself.

In trying to appraise our whole supply and transport performance in France (and it is all part of the larger American war story), it is well to remember that practically without preparation we were suddenly called upon to send an army overseas and sustain it. Back of this lay the fact that we had to create and train that army first. Until we went to grips with Germany we had no considerable armed force. What we did have was largely national guard. The regular establishment never exceeded 100,000 men. It was scattered throughout the United States, Alaska, Porto Rico, the Philippines, China and Panama. A colonel seldom had his regiment together; save at manœuvres we never mustered a brigade; until the mobilisation on the Mexican border a division was an impossibility. The European war produced the General Organisation Project which outlined a real American army comprising a larger combatant force than the whole Union had at the close of the Civil War; many more men than Grant had ever handled at any one time. The modern army not only fights but invents. Into its scheme must go every aid that science or German hellishness have brought to honourable combat. It means wireless, searchlights, gas and aeroplane service, and countless other things undreamed of when we went to war with Spain. Yet this scheme was only on paper when the hour struck for Amer-

ica. It meant, as far as our present purpose is concerned, that the vitally necessary agency to feed, equip and transport troops on a large scale was barely in the making. Now you can see why we have had to build and serve and fight in France, all at the same time.

Search all history and you will find that no great military effort was ever made under the handicaps that tried the souls of the organisers of the American Expeditionary Forces. You must know them before you can make a real estimate of that far-flung line of communication that not only binds the American trench to warehouse and factory but never knows a break.

First of all we have what may be called the moral obstacle crystallised in our national ignorance of what an army is. To our credit we have always been a peace-loving nation. But when the world is at war this state of mind is not altogether an asset. Although many Americans outwardly hooted at Mr. Bryan's theory that "a million men would leap to arms between sunrise and sunset" many of them secretly thought he was right. They changed their minds when the draft came along and the era of the training camp began.

It was the fashion in many quarters to jeer at the regular army, to deride, for example, the quartermaster who in the popular ignorance was looked upon as a sutler or a glorified clerk. Yet it was the band of devoted regular quartermasters, capitalising their hardwon experience in Cuban jungle, Philippine wild,

or on the sun-baked Mexican border, who formed the nucleus of the wing of our enormous supply service that is the backbone of the system. Then, too, Americans did not readily grasp the idea that a great army must be equipped and, what is most important, properly organised and officered. All this required Education at a time when intelligent and alert Co-operation should have been the watchword. It only made our job in Europe all the harder.

But this moral handicap paled before the physical obstacles that grimly blocked the way. Heading the list was the super-problem of transporting men and supplies across three thousand miles of sea, full of hidden terror and destruction. With a minimum average requirement of five tons of shipping for every man in France the magnitude of the proposition is at once apparent. *And we had no shipping.*

Right here came the fundamental difference between the subsistence problems of the three leading Allies. The French had all their sources of supply at hand; England could rectify her water transportation in twenty-four hours; with us it was a matter of three weeks' time between departure and arrival. Empires have been won and lost in that time.

Once we arrived in France we found that all utilities such as docks, railways, and telephone and telegraph lines were being used by others, principally the French, but in many instances by both the French and the British. Instantly there came the inevitable and peaceful conflict with French laws. If you have ever tried to do anything "official" in France you can at

once appreciate the tangle of red tape and the maze of complications into which we were plunged.

Then, too, there was the great difficulty of operating in a foreign country whose language and customs were unknown to the great majority of our men. Finally we had to expand our little peace organisation into an immense and elastic overseas expedition that would take its full part in helping to defeat the mightiest of all military machines that had been forty years in the making and which was still going strong.

Such was the seemingly impossible task that confronted us in April, 1917. To-day the impossible has been made possible. The American Army that holds its well-won place in the battle line of freedom; the unbroken chain of supply and transport behind, stretching from Alsace-Lorraine to San Francisco, is the answer that Yankee resource, energy and patriotism have made to the Great Call. How has it been done?

Come with me to the little French town which houses the General Headquarters of the A. E. F. and I will show you both the mainspring and the inspiration. In a simple office, in a weather-beaten building that flies the American and French flags at its gate and whose stone walls have echoed with the swords and spurs of many generations of French soldiers in the making, sits the erect, serious, keen-eyed man whose broad shoulders bear the chief burden of responsibility of our armies abroad. General Pershing foresaw what would and did happen. "To foresee," said the French philosopher, "is to rule."

In this military statesmanship lies our safety and our success in France. It was his grave eyes that beheld the vision of American opportunity, and it has had a rich fulfilment. The simple reason why we met every extraordinary and unexpected demand upon us is that our facilities are so elastic as to be capable of almost indefinite expansion.

Had they been rigid—that is, limited to the estimate of our original overseas force—we, and probably the whole Allied Cause, might have been lost. As it was they stood the well-nigh incredible strain in amazing fashion and reveal the Commander-in-Chief both as Seer and Soldier.

Let us go back and see just what happened. When the “C. in C.,” as the head of the army is called, arrived in France in June, 1917, the war situation was apparently satisfactory. The British were well established up the Somme; everywhere the French held their own; the Italians were pushing confidently on. An optimist would have said: “All is well.” The programme of our expeditionary force, then set for 500,000 men, seemed to be ample for all needs.

But General Pershing saw beyond the security of that hopeful hour. Russia had begun to crack and in the Slav disintegration that followed lay disaster for us all. France was bled white; England was combing out her man-power; America was the last, the only, reserve. The final brunt would be hers.

So this far-seeing chieftain looked ahead to the contingency that might arise, not in a year but in two or three. How wise was his foresight was amply

GENERAL HEADQUARTERS  
AMERICAN EXPEDITIONARY FORCES

July 20, 1918.

Dear General:

Mr. Isaac F. Marcossan has been authorized by the Commander-in-Chief to write a book regarding the activities of the S.O.S., similar to his work covering the same ground in the British Army. The various chapters will come out as articles in the Saturday Evening Post.

Please afford him all necessary facilities in the conduct of his investigation.

*John A. ...*  
Chief of Staff.  
*den.*

Commanding General,

S.O.S., American E. F.

*To all subordinate officers of the S.O.S.  
afford all the facilities possible  
to Mr. Marcossan.  
Aug 1st 1918.*

*William H. ...  
Chief of Staff*

FAC-SIMILE OF THE ORIGINAL ORDER ISSUED AT AMERICAN GENERAL HEADQUARTERS AUTHORIZING MR. MARCOSSON'S INVESTIGATION OF THE S. O. S.





proved by subsequent events. In less than twelve months from the time of his advent Italy's reverse had been registered, Russia, prey to anarchy and misguided uplift, had made her obscene peace with the Kaiser; the German offensive had swept the British down the Somme; once more Paris was the target of attack.

Out of that encircling gloom flashed Lloyd George's famous "Hurry, hurry" appeal to America, and it was not sent in vain. Like those hosts of the 'Sixties who marched to Father Abraham "Five hundred thousand strong," the Yankees came sailing over the sea. Every schedule was quadrupled; all original estimates and plans went by the board. A steady stream of khaki poured into France. What was more, it was debarked, supplied and rushed up the line and all because the supply and transport machine, conceived in foresight and builded in wisdom, met the test. It made Château-Thierry, Saint Mihiel and all that has followed possible.

Those heroes of pick and spade and derrick who had toiled in port and supply depot had their full hour of compensation. They saw the original army of 500,000 swell into a million and then reach far beyond, and no man went unfed.

The machine which began with bare hands and stout hearts has grown to a giant with limbs of titanic strength. It is not only working for this war but for generations unborn. In the scope and permanency of its structure lies the real earnest of our endeavour in France. Its parallel is the mass of stone and

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concrete war buildings rising in Washington not reared for to-day but for the future.

Just before I started on my investigation of the American army I spent the night with old friends at British General Headquarters in France. We discussed our immense supply preparations which interested them immensely. Suddenly a grizzled General with a foot of service ribbons on the breast of his tunic said:

"Your people are working on the theory that the war is going on indefinitely. It's amazing."

He hit the American nail on the head, for this is precisely what we are doing in France. The Domain of Supply and Transport which we are about to explore is a vast business institution that, while dedicated to war, is bound to have a tremendous significance with peace.

The tiny acorn which burst forth as the American Expeditionary Forces was planted in an environment that was in sharp contrast with the forest of effort that it has produced to-day. In that precarious June of last year when General Pershing and his handful of fellow officers faced the task of creating a system of combat and supply overseas, the offices of the expedition were in a modest building in the Rue Constantine in Paris. Almost within the shadow of the stately and gilded dome of the Invalides which shelters the dust of the great Napoleon was born the whole organisation which has become a prop of the war. Here first of all the General Staff in France was created. Later, in a back room and at a conference presided

over by the Commander-in-Chief in person, what is to-day the Services of Supply came into being. It was not originally known by its present comprehensive designation. It had various titles and functions. Its career is studded with picturesque happenings and striking personalities, and they are all part of our narrative.

After four years of war the average reader need not be told that in any army in the field there are two separate and distinct organisations. One is that section which fights and which is known as the Combat Army; the other is the equally necessary wing which mans the Lines of Communications and in which Supply and Transport have their all-important part. Down these lines flow the life sustenance of the fighting man.

At that first meeting in Paris to which I have just referred was born an institution, typically American in character and which is the very rock on which our whole activity abroad is reared. It grew out of the peculiar handicaps under which our overseas expedition laboured from the start. Up to that time the most difficult supply and transport problem of the war was Britain's. She had to carry troops and supplies to Mesopotamia, Salonika, Egypt and France and maintain those forces. But compared with our requirements and problems abroad this was not so overwhelmingly difficult, because the great mass of her overseas troops were in France and never fighting more than a hundred and fifty miles at the outside from their home ports. The Australians, to be sure, had to

come five thousand miles from their native bush and range, but they only carry their initial supplies. England furnishes the rest from her home and other depots. Although a considerable portion of the British army supply is gathered from different parts of the world and is subject to the sea menace, she was not absolutely dependent upon these foreign sources.

With America it was different. We were up against the staggering proposition of not only conveying all our troops over three thousand miles of danger-ridden sea but likewise carrying the great bulk of our food, equipment and munitions the same way. Our system of supply had to be break-down proof. How to accomplish this was the proposition put up to that group of pioneers of America abroad who sat around the table in that dingy back room of the Rue Constantine. No wonder they thought of the intrepid little soldier whose dust reposed just across the way and who likewise had his troubles with food and transport many, many miles from home.

These men knew that long before they could even dream of joining the smoke-enveloped battle-line of democracy they must settle the all-important question of a continuous subsistence supply. Emergency—that unfailing speeder-up of idea and event—came to their rescue. At that round table was devised the remarkable plan known as Automatic Supply which is the essence of our whole overseas system. Just as printing is the art preservative of art, so is this scheme the means preservative of our lives and our fortunes abroad.

To grasp it fully you must understand the very obvious fact that in war a reserve of food and supplies is all essential. That ancient and familiar saying that armies fight on their stomachs is as true to-day in the era of machine-gun, poison gas, wireless, aeroplanes and tanks as it was when cave men fought with stone weapons. The strength of the army food reserve depends upon the distance of the fighting force from its base. With the British Expeditionary Force the so-called fixed food reserve is thirty days. This means that all the huge supply depots in France and England (I shall use the British Expeditionary Force in France for the contrast), a quantity of food, fuel, and forage equal to thirty days' consumption by man and beast is maintained. No matter what happens this reserve must be kept up. It is the insurance against enemy action, break down or delay in transport—any of the many emergencies that rise up in war and knock down the best laid plans and incidentally destroy precious supplies.

But England in France, as I have already pointed out, is only a comparatively short distance from her home reserves. A short trip across the English Channel can rectify any dislocation in her food communications. What were we to do three thousand miles from our home ports and factories?

No one could tell then, any more than they can tell now, just what the submarine would do. Not being a heedless optimist General Pershing, together with his advisers, took no chances. They assumed the worst would happen, so they framed up the famous

plan which I have referred to as the Automatic Supply. This provides the unfailing and yet flexible meal ticket of the A. E. F.

By this procedure our whole food supply—and for that matter all munitions and supplies, even a whole railway system from spike to station—*renews itself automatically*, and therefore without the formality of special requisitions for stores. In the simplest way this is the way the system works:

For every unit of 25,000 troops that goes to France—whether they arrive in one convoy or in detached groups—a four months' supply of food is also sent at the same time from the United States. What amounts to a thirty days' supply goes with the men while a ninety days' reserve is shipped coincidentally. This ninety days' reserve becomes the backbone of our effort. It may not land at the same port as the unit for which it is designated but it reaches France and becomes part of the general food reserve. No matter how many units of 25,000 men may leave the United States this ninety days' reserve becomes their traveling companion, near or distant. It is on the ocean at the same time.

By making this reserve cover ninety days we have trebled the British quantity and taken into consideration what those wise men who framed the system had in mind, namely, the very worst that the submarine could do. The destruction of a whole month's or even two months' supply could not mean disaster for us.

This process is technically known as the Initial Sup-

ply. It means that with the Automatic Supply which I shall describe in a moment, sufficient food, with the exception of fresh beef and a few minor ration components, is constantly kept in France to last our whole overseas force four months.

But troops must eat and at the same time the integrity of this ninety days' reserve must be maintained. How is it done? Here is where the Automatic Supply comes in. Every month there is shipped from the United States sufficient food to feed our overseas force for thirty days. It is in units of the needs of 25,000 men. This might be called the standing order of the army and is for current consumption. It moves like clock-work every thirty days. It is precisely as if a housekeeper had left a permanent order with her grocer to send her on the first day of every month enough flour, tinned goods, salt, pepper, vegetables—in fact all her kitchen needs—for thirty days and he scrupulously followed instructions. If he is a good grocer she never has to renew the order save when her family increases. The Acting Quartermaster General at Washington, Brigadier-General R. E. Wood, is the good grocer; he never misses a shipment to France. For every unit of 25,000 men that set foot upon France he simply chalks up another increase to that immense standing order. Nothing can be simpler than this system.

All supplies are not, and cannot be automatic. Every hour of the day and night in France some emergency leads to unexpected demands. Take Ordnance. A big push may use up an immense amount of ammuni-

tion and cut into the fixed reserve which is based on the daily needs of all guns. Take Construction. The unexpected advent of troops in certain regions who need barracks, together with the demand made on the light and standard gauge railway for extensions, may consume material far beyond the widest provision made in advance. All this must be renewed and at once, and it is done through so-called Exceptional Requisitions, or Demands, as they are called by the British. The articles thus obtained are termed Exceptional Supplies, and are only sent in response to a special requisition made on the War Department by the Supply Service in the field.

Here in brief is the crux of our supply system in France. An extraordinary and unprecedented remedy which has proved to be not only submarine proof but has stood up against every tremendous demand made upon it. With a knowledge of this bulwark of the soldier's stomach—the fundamental war precaution—we can now proceed to the story of the complete army organisation in France which is necessary before we can explain the concrete workings of the Services of Supply.



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## II—*The Business of War*

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**I**F those meetings of General Pershing and his first colleagues in the Rue Constantine in Paris had only hatched out the Initial and Automatic Supply systems they would have been historic. But they did much more. In the creation of the General Staff of the A. E. F. they laid the foundation of the whole close-knit combat, supply, and transport scheme which enabled the A. E. F. to assume its full share of the terrific burden of war.

If you know anything about war you also know that everything radiates from the Staff. Individual initiative is only possible or effective in the emergency of battle or with a sudden breakdown in transport. The successful conduct of modern war is the result of team-work, co-ordination, the fitting together of many units. It is the product of many closely-at-tuned minds. The real and unadvertised work of war therefore is done behind closed doors. Its secrecy and silence are in contrast with the crash and carnage of the tragic tumult it produces.

Let us take the General Staff at General Headquarters first. Although we have nothing to do with fighting, we must understand its functions, because they are duplicated to a large extent at the Headquarters

of the Services of Supply. This is as good a place as any to emphasise the fact that in France we have two absolutely separate armies, with entirely separate and completely equipped headquarters from a Commanding General down. One is the General Headquarters presided over by General Pershing, who is the supreme chief in France and whose job is fighting; the other is the Headquarters of the Services of Supply whose job is to sustain and equip those fighters. Each of these Headquarters has a General Staff similar in organisation although the body at General Headquarters is senior in authority and creates the larger policies which the Staff of the S. O. S. interprets.

The staff at G. H. Q. has five sections devoted to Administration, Intelligence, Operations (which is fighting), Co-ordination and Training. Originally these sections were known by these respective activities. Subsequently the designations were changed. Administration became G1. This is the Wholesaler and gets tonnage and personnel to France and also purchases in France. Intelligence, now known as G2, deals with all information about the enemy. It has ramified functions that range from censorship to counter-espionage. Operations, now G3, employs troops in the field. Co-ordination, which is G4, handles and distributes what G1 procures. But it does much more. It is the supreme standardiser, one of the most remarkable agencies that we have devised in the war. You will hear a great deal about it as we proceed with this narrative. Training (which has be-

come G5) trains the personnel which G1 gets to France. Here is a bird's-eye view of the General Staff, which is the Board of Directors of the Business of War. All these sections are tied up to Chief of Staff, who is the link between the work of the army and the Commander-in-Chief.

The Staff meets every morning in the office of the Chief of Staff, who at G. H. Q. is Major General James W. McAndrew, just as the directors of the Standard Oil Company used to assemble daily at 26 Broadway. It enables them to keep abreast with what is going on. What is equally important, every head of a department knows what the other heads are doing. In this knowledge lies power in war. This war, more than any other, has proved the value of co-ordination. It was not until Marshal Foch became *in fact* the head of a United Allied Command that we made definite and what seems to be permanent progress. Up to that time every big Allied army went practically "on its own," and the Germans wisely capitalised this lack of perfect team-work. The Germans have always excelled in Staff work.

With a small army this elaborate staff system is not necessary. The heads of the various sections, that is, Operations, Supply, Transport and Intelligence, can go direct to their Commander-in-Chief and talk affairs over. But when that Commander is at the head of millions of men spread out over Lines of Communication six hundred miles long this is impossible. He must have understudies to digest and co-ordinate the routine problems, dispose of the general Business of

War, and leave him free to create and deal with the larger measures. The various sections thus become miniature minds of the "C. in C." who think and plan and sometimes execute for him. By an elaborate and comprehensive system of condensed diaries he knows just what they are doing each day.

This Staff system at G. H. Q. and its functions are duplicated at the Headquarters of the Services of Supply except that only G1, G2 and G4 are represented. The S. O. S. has nothing to do with fighting, therefore it can dispense with G3 and G5. Its main sections are G1 and G4.

Such, in brief, is the directing force that set up the America in France. Originally it was housed in Paris. As our troops began to arrive and our scope of supply widened those buildings in the French capital proved insufficient. We needed more executive elbow room. Besides, it was becoming more and more important that General Pershing should be up where his army was beginning to assemble. In September, 1917, we established our General Headquarters at Chaumont, a French town in the North. There—and for the first time in the war—the Stars and Stripes were unfurled almost within sound of the guns. We had entered the Great Struggle at last!

I went to those Headquarters not long after they had been opened. The drowsy little town still blinked at the unaccustomed sight of Americans in uniform; our troops were few; there was a sense of newness and crudeness. General Pershing and his colleagues were feeling their way through the enormous respon-

sibilities that hemmed them in. Not so many miles away those pioneer divisions who blazed our way to France were shivering in their first billets.

I went back last summer. The one-time sleepy town was a bee-hive; the brown of our khaki vied with the verdure of the hillsides around; the roads everywhere were alive with our transport; the General Headquarters had a seasoned and business-like look; we had spilled our blood on the soil of France; you got the thrill and the sense of actual war participation. In the same office where I had seen him before sat that grave-eyed Commander-in-Chief, still modest, still unassuming, still consecrated to the task which in the intervening twelve months had made him a world figure.

In those General Headquarters, now the nerve centre of our fighting, the Services of Supply as at present constituted were organised. When General Pershing moved to the North the Chiefs of Supply eventually followed. They were marshalled under the head of "Lines of Communication." As our armies grew and took their place in the line the need of a concentrated supply establishment became evident. It was felt—and wisely—that with our swift expansion G. H. Q. should be free to devote itself to operations.

General Pershing therefore appointed a Board consisting of (I use their present ranks) Brigadier General Johnson Hagood, Colonel Avery Andrews, Brigadier General Frank McCoy, Brigadier General Robert Davis and Major Pierce Wetherell, to devise a plan to this end. The net result was that the Supply Depart-

ments were divorced from G. H. Q. and moved to Tours. General Headquarters were now free to concentrate on fighting while in that charming little city on the banks of the Loire, in the heart of the Chateau country, where Balzac and Rabelais were born; where Joan of Arc came in shining armour in the crowded hour of her triumph and where, oddly enough, the Hun of other days got his final reverse, became the capital of the Domain of Supply.

It was early this year when the American flag was officially broken out at Tours over a quadrangle of French barracks sentinelled by trees and with the usual large parade ground in the centre. But it was a much larger kingdom than Supply and Transport that took up its abode there. Under reorganisation the Services of Supply annexed the services of Quartermaster Corps, Ordnance, Gas, Air, Engineering, Construction, Forestry, Railways and Roads, Medical, Mechanical Transport, Signals and Communications, Postal and Express, War Risk Insurance; in fact, every detail that contributed to the upkeep, the safety, the combat, and the renewal of the armies in the field. Even Graves Registration, the chronicle of that last sad chapter in the life of the soldier, found refuge under its broad and comprehending wings.

The first Commanding General was Major General F. J. Kernan, who developed the whole scheme of what was for a brief time called the Services of the Rear, and which is now the unshakable "S. O. S.," one of the prides, even as it is also the backbone, of the whole American Expeditionary Force. To tell

its story therefore is to describe the activities of every-thing American in France except that which happens in trench and field.

Nowhere in this war will you find such a self-contained Empire as is presented by the American Services of Supply, indeed—the whole A. E. F. It is unique in the annals of military organisation. With the French there is always Paris to suggest or to change; with the British, the War Office in Whitehall lies only a few hours' journey across the Channel and many miles of red tape join it to General Headquarters. But with the American force Washington is thousands of miles away in fact and in domination. The distance is too great and time in war is too precious to refer everything to the home powers that be. They have wisely reposed a confidence in the leader of our armies abroad that has been amply justified by his achievements. Here you have the antidote against the costly disasters, bred by the political interference that hampered great American generals from Washington down the line through Grant to Shafter.

Geographically the Services of Supply includes all Continental France and Great Britain for our supply tentacles have now spread out in many directions. The domain is divided into nine Sections and two independent Districts, which are Tours and Paris. With one exception (England) all these sections are in France.

Each of the French ports that we use is the nucleus or capital of a Section which also includes some of

the adjacent territory. Midway between the coast and the front is the Huge Intermediate Section, while still nearer the fighting line is the Advance Section. They are all joined by American built and American operated communications.

In examining the organisation of these Sections you get the first hint of that self-sufficiency which is such an outstanding feature of our army structure abroad. Every Section is in command of a General who has the necessary Administrative and Technical Staffs. He has absolute control of all matters of discipline, police, and sanitation in his bailiwick and has general supervision over all technical activities carried on there. It is a little sovereign State. If a question arises that touches or involves a neighbouring Section it becomes, like matters of Interstate Commerce in the United States, a question of Federal jurisdiction and goes up to the Commanding General of the Services of Supply who is the Chief of all these subsidiary Generals.

It is just as if we had established a United States of Supply overseas with Tours as the Washington. As a matter of fact, Tours is the American capital of France. The Commanding General of the S. O. S. is a sort of transplanted President whose only higher authority is the Commander-in-Chief of the American Expeditionary Force and whose Staff Officer he is.

Looking at the organisation from another angle (familiar to most Americans), you can see it in terms of the military arrangement of the United States in peace times. Following this analogy, the Headquar-



ters of the S. O. S. at Tours corresponds to the War Department at Washington. The different Sections are like the various Departments such as the Department of the East, the Southern Department or the Department of the Southeast. Each of these Departments in the United States has a Commanding General who corresponds to the General in charge of one of our foreign Sections. The two independent Districts (Tours and Paris) bear the same relation to the whole overseas organisation that the United States Military Academy at West Point bears to the home structure, which comes directly under the authority of the War Department.

In addition to control over the Generals of the various Sections the Commanding General of the Services of Supply exercises a stewardship over the Chief of every Service that makes up his immense domain. The head and staff of all Departments, save Light Railways, which are a necessary adjunct of fighting, are quartered in and about that picturesque quadrangle in Tours, and are accessible at any hour of the day or night for reference or discussion.

Such is the Supply World over which Major General James G. Harbord, who succeeded General Kernan as Commanding General of the S. O. S., presides to-day. He is big of bone, smooth of face, alive with humour—a self-made soldier risen from the ranks and with a trail of active service that stretches from the Philippines to the bloody fields of France. There is no mistaking his power and punch. It is written in a square and unyielding jaw and in a determination

that the Germans learned to their cost when his division helped to block their way to Paris last July. It was as Chief of Staff to General Pershing in those heart-breaking days when first we set up military shop abroad that Harbord wrote his wisdom and his foresight into our overseas preparation. He can lead and he can rule. He is the highest type of the Soldier-Administrator. Study his task and you find that, as the slogan of the S. O. S. well says, "All the fighting is not done at the front."

He operates in precisely the same way that General Pershing holds forth at Headquarters, although his task is somewhat more varied and complex. The Commander-in-Chief is mainly concerned, so far as active duties are concerned, with fighting. The tools of this bloody trade—mainly men and munitions—are placed at his disposal. General Harbord, on the other hand, has to deal with the intricate problems of the procurement, distribution and maintenance of these tools of war. Every ton of freight and every American soldier that enters France must come through one of the ports under his jurisdiction. They must be classified, stored or moved to their proper station. An endless chain of facilities and a complete and sleepless control and supervision are required.

Yet every morning there is laid upon his desk a sheet of paper on which is typed the total number of American troops, civilian employés and prisoners of war in every Section together with all American troops with the British or French; the total number of mouths fed by the A. E. F.; the precise amount

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**MAJOR GENERAL JAMES G. HARBORD**  
*Commanding General of the S. O. S., A. E. F.*



of food on hand at every supply depot in days and rations; the number of animals in France and the quantity of hay, oats and bran available for them; the exact quantity of ammunition in reserve in terms of specific calibres; the total ship tonnage unloaded the day before; the number of cars loaded for shipment and the tonnage in them; the cargoes on every ship in every port we use in France or England; and the number of beds—empty or occupied—in our hospitals together with their crisis capacity which is the total hospitalisation in case of emergency. In a word, this marvellous sheet, called the Daily State of Supply, is the up-to-the-hour epitome of the whole American situation in France.

More than this General Harbord, who is not temperamentally inclined to be tied to a desk, spends three or four days every week—sometimes more—travelling up and down his Supply World in his special train which has sleeping, dining and office cars and is a Headquarters on Wheels. He pops in on Section Generals at their offices; makes sudden descents upon loading gangs at the docks or construction units in the field. He can stop his train anywhere in France, hitch up his telephone or telegraph instruments to American wires strung on American poles and talk to General Pershing at General Headquarters or any one else in the country. How are all these miracles achieved?

Like the rearing of our whole physical structure in France, there is no magic or mystery about it. It all results from the fact that we have built up a

compact and co-ordinated system for the conduct of the Services of Supply that is distinctly American in swiftness and in efficiency. It is simply part of the Business of War, American Brand. To a war that was believed to express the last word in science and organisation we have brought new wrinkles.

General Harbord's freedom of action and the remarkable grip on the American situation in France as revealed on the Daily State of Supply are made possible first of all by staff work. The General Staff of the Commanding General of the Services of Supply, as you have already been told, only includes three Sections—G1, G2 and G4—because he has no problems of combat or training. Each of these Sections has a head, designated as an Assistant Chief of Staff. In charge of G1 is Col. J. B. Cavanaugh; in command of G2 is Lieutenant Colonel Cabot Ward who was once Park Commissioner of Greater New York and a fine type of Reserve or Temporary Officer who is rendering conspicuous service in the war, while Col. H. C. Smither is at the head of that all-useful and universal G4.

These Assistant Chiefs in turn report to a Chief of Staff—Brigadier General Johnson Hagood. Clean of limb and face and a seasoned veteran of field and staff service despite his apparent youth, he is a master organiser and a live wire. Under his stimulation the General Staff takes the burden of routine from the shoulders of General Harbord just as the Staff at the G. H. Q. lightens the way of the Commander-in-Chief.

The Assistants are in constant touch with the Chief of Staff and the Commanding General himself. It is their duty to act in his name on the bulk of the executive questions that arise, and they are many and complex. Hence he is free to move about his Kingdom. As at G. H. Q., you have a small group of understudy minds, although at Tours they have to cope with an infinite variety of subjects. These Assistants are guided in making decisions by their knowledge of the expressed desires of the Commanding General with regard to policies. Hence they must be men of keen intelligence and quick to grasp significances.

The Section of G2 is a minor one in the administration of the Services of Supply. Therefore the burden of the Staff labours and responsibilities fall upon the Chief of Staff and the heads of G1 and G4. In general terms—we will take up the specific work later—G1 has authority on all matters of administration, organisation and procurement of personnel and material from the United States, which includes the vast tonnage question, while G4 deals with construction, transportation and supply, having particularly in mind the co-ordination of all these activities. Both G1 and G4 connect up with every unit in the Services of Supply. By telegraph and telephone and daily reports they keep in constant communication.

Let us now sit in with the General Staff at its daily morning meeting. You will get such a demonstration of snappy team-work as to make you sit up. The walls of the office of the Chief of Staff—like those of the Commanding General—reflect the spirit of our

organisation and the way it is swung. First of all you will see the great Supply Map of France criss-crossed with our lines of communication. At first glance you may think that this is a picture puzzle, but on closer investigation you see that these winding and coloured avenues are studded with symbols. You see stars in circles, ships, tents, crosses, coffee pots, buildings. You are not long in finding out what they mean. At the lower left-hand corner is a key to the puzzle. Each symbol has a meaning all its own. The star in a circle indicates the General Headquarters; the ship shows the location of a port that we use; the tent is the site of an instruction camp; the black cross reveals a base hospital; the white cross a rest station; the coffee pot a coffee station for travelling troops; the engine a locomotive repair shop; the freight car a car erection site; the bumper a railway regulation yard; an axe a forestry camp; the propeller an aviation camp; the bursting shell an ammunition depot; a tiny house means a refrigerating plant; a black naval pennant a Section Headquarters, and so on. In other words, you can look at this map and see at a glance the scope and extent of all our activities in France, and what and where they are.

On the wall are also square yards of charts and diagrams for this is a war of organisation all put down on specifications and blue prints long before a wheel is turned or a shot fired. It is one of the many sheets Mars has taken from the Book of Big Business. I have seen square miles of army diagrams in this war, but I have never seen any that were more



concrete or comprehensive than those used by the Services of Supply. Every Service has its master chart; every subordinate section has its own little sheet. Put three men together in an army office in France, and the first thing they do is to create a little chart of their organisation. Nor is it a wasted effort. A great master of American industry once said: "Teach with the eye," so he put signs all over his factory. The man who knows just what he has to do and where he belongs seldom makes mistakes. Hence the value of the chart in the Business of War.

A single detail in General Hagood's office reveals the spirit of the organisation and why it does things. Over the large clock hangs a placard containing this inscription: HURRY UP—C'EST LA GUERRE ("It is the war"). It reminded me of another sign hung up somewhere on our Lines of Communication by a bureau chief who had once been in the Coast Artillery. It proclaimed the warning familiar to all coast travellers: "Cable Crossing. Do Not Anchor Here." He was determined that his visitors should waste none of his time.

General Hagood is at his desk every morning at eight o'clock. These army heads are early to work and they stay late. There are no office hours in The Business of War. The Chief of Staff finds on his desk what is officially known as the Diary. It is a compact résumé, a complete catalogue of S. O. S. events, compiled by G4, of every important proceeding of the day before. This Diary, which is as rep-

representative a piece of scientific organisation as the Daily Supply State, is arranged under headings.

Under Troop Movements you find: "The Nth Division has been moved to the X Training Camp"; under Hospitalisation, "The construction of a ten thousand bed hospital has been ordered at Z"; under Quartermaster Corps: "The Chief Quartermaster has been ordered to turn over 100 carloads of sugar to the French"; under Remounts: "Eight thousand horses are now at the Remount Camp at W"; under Construction: "Five new warehouses have been started at Blank Supply Depot," and so on until every item of large value has been epitomised and chronicled.

At 8.30 o'clock General Hagood has his daily conference with the heads of the Sections. Once more you have the Directors' meeting of the Business of war. With the Diary before him, which he has already read, the Chief of Staff asks the why and the wherefore of the various steps and changes enumerated in it. In the case of the movement of the Nth Division he may ask: "Why did not these troops go into barracks?" or with the item relating to the Chief Quartermaster he may inquire: "Is this in accordance with the terms of our new food agreement with the French?" In the matter of those eight thousand horses the query may be: "Does this complete the project for this Remount Camp?" while referring to the construction of the new warehouses he may ask: "Is this depot proceeding towards construction on schedule time?"



**BRIGADIER GENERAL JOHNSON HAGOOD (Left)**  
*Chief of Staff of the S. O. S., A. E. F*  
and the Author

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I cite these questions to show, first of all, how the Chief puts an unerring probe into everything that is done; second, by knowing just what is being done within twenty-four hours after it has been started he can rectify any mistake before it has gone too far. This is especially true of large construction such as barracks and warehouses. It also applies with special importance to the shifting of the labour battalions.

One great value of this Diary and the operations that contribute to it, is that it disposes of matters at once. In the old army day and way every individual item that I have mentioned (and in fact everything that referred to any phase of army work), not only had to be mulled over and indorsed by a dozen people but literally had to break its way through miles of red tape. Instead of swift action there was interminable delay which clogged the wheels of progress.

In the case of the S. O. S. the Chief of Staff, expressing the desires of the Commanding General for whom he acts, delegates authority to his subordinates, the heads of the various Sections. They act upon their own judgment and the information they possess, and the result is that there is no hampering in effort. Now you can see why the Commanding General is free to move about his domain and also why the Chief of Staff likewise has a clean desk and can turn at once to any large emergency that arises. It all combines for a flexible system of supervision and supply. The men at the helm are not desk-bound, and the myriad of personnel and material they control are equally elastic.

The Diary is only one of a series of reports which deal with the Progress of Supply. As a sort of corollary to the Daily State of Supply is a document called The Daily Situation, which is a miniature typewritten newspaper, prepared by G4 and which goes to the Commanding General and the Chief of Staff with the Daily State. It is a General Summary of vital problems that cannot be discussed in the Diary, which deals only with actual events. It details, for example, such emergencies as temporary congestions in the railway regulating stations. It also deals with the tie-ups in troop traffic, with tonnage difficulties, with troop arrivals, with the ammunition situation, indeed all the many unexpected emergencies that try the soul of the army administrator operating three thousand miles from his home base and in a country where he must wrestle with strange laws and employ public carriers that have systems and regulations not altogether geared up to swift and strenuous American ways.

When any one of these contingencies develops the Chief of Staff or the head of G4, or both, at once calls a meeting of the Chief of the Service involved and his principal associates and threshes it out. Thus he gets at the specialists who know exactly what they can do and who have the wherewithal to do it.

By now you will have gathered that both G1 and G4 are important links in the American Army machine. It is high time therefore that we look into their ramified functions. They unfold a system of scrutiny and co-ordination that is little less than a triumph of organisation. Nothing in the whole rec-

ord of army administration surpasses them in the perfection and execution of detail. Yet it was all conceived and is, in the main, dominated and operated by regular soldiers who have come from camp and field to sweat over charts, telegrams and statistics. Again you discover that all the fighting is not at the front—that war is work and worry.

We will begin with G1. Although it deals with administration and organisation, its chief work is procurement of men and material from the United States. Here you touch the supreme problem of the A. E. F., which is tonnage. So far as the United States are affected, this is a War of Tonnage. Every square foot of cargo space is precious and must be utilised to the last cubic inch. Every service in France wants all the tonnage it can get. The movement of troops and therefore their needs, exceeds all original estimates. The furnace of war must be kept fuelled. The lot of G1 therefore is not an easy one.

Since there is only a certain amount of tonnage available it follows that it must be allotted, or "allocated" as the army phrase goes, to the best possible advantage. This allocation is the pivot around which G1 works. Now we get to the first actual link with Washington which, through the Ship-Control Committee of the Shipping Board, is the Tonnage Provider. On the tenth of every month G1 in France wires to Major General George W. Goethals, assistant Chief of Staff, to find out how much tonnage is available for France the next month. He wires back the amount. For the sake of illustration let us say

that it is 500,000 tons. This figure then becomes a sort of target of attack, because all overseas demands are focussed on it. It is like a cake set out for consumption before a hungry crowd. Everybody wants to get as big a slice as possible. The troubles of G1 begin.

The allocation of tonnage is based on the Requirements of the various army services abroad. The task therefore is to balance all these requirements so that every need will be met and in the priority of that need. Hence Priority, which has come to be such an important factor in Industry as well as War, takes its station in the big game.

This is what happens: If G1 finds that 500,000 tons of shipping are available it will allot, let us say for the simplest explanation, 250,000 tons to the Quartermaster's Corps; 100,000 tons to the Medical Corps, 100,000 tons to the Engineers, and 50,000 tons to Mechanical Transport. There are of course many other services, but these four will serve our purpose.

Every head of a Service now makes up his Priority Schedule in the order of the urgency of his needs. In the general priority programme Food, Fuel, Forage and Clothing always come first. In our hypothetical case the Quartermaster has 250,000 tons to his credit. He cannot touch that fixed reserve of ninety days. Likewise the monthly automatic supply must be kept moving. On the other hand, he has a host of other supplies to obtain. Therefore he must do some juggling. He must determine whether rolling kitchens should come ahead of army wagons; if jam should



have precedence over overcoats, and if vinegar is more important than olive oil. In the same way the Chief Surgeon must decide whether arnica outranks castor oil; the Director of Mechanical Transport must determine if the bulk of his space is to be used for trucks instead of passenger cars, while the Chief Engineer must decide whether fabricated buildings or construction tools have the precedence. I have only used one or two typical items. As a matter of fact, many thousands enter into the combined tonnage estimates of the A. E. F.

All these requisitions, made up in the order of their priorities, go to G1, which censors them, and then transmits them to the United States by cable, which leaves France not later than the middle of the month. This means that the Requisitions for July shipment must go by June 15th. Requisitions for replacements of men are made in exactly the same way, and there is a priority for human beings just as there is for Food and Supplies.

G1, however, does not use up all its tonnage for these regular Requisitions. It must keep a surplus to meet the many exceptional, that is, unexpected demands. Then, too, the heads of Services frequently change their Requisitions, which means a fresh cablegram to Washington from G1. On the back of this cable, for office reference, you see this tonnage in cubic feet. G1 must know to the pound just how much of its space is being used up. All this actual allocation of tonnage is done by the G1 of the Services of Supply. The senior G1 at G. H. Q. is only used as

a Supreme Court in shaping the larger tonnage problems.

Allotting space is only one phase of Gr's tonnage job. It must keep its finger on the pulse of the whole ceaseless ship movement between America and France. It must know how and when cargoes are unloaded and when ships start back. What is known as "Turn Around"—the round trip—must be made as quickly as possible both for troop and cargo vessels. Take a look at the so-called Tonnage Room, and you will see how this difficult task is made easy, visible and comprehensive. It is another revelation of what American system can accomplish when geared up to the Business of War.

The walls of the Tonnage Room tell the story. They are hung with Charts of Tonnage Progress. You can stand in the centre of this Chamber of Revelation and see, in coloured lines, figures and diagrams that a child can understand, just what is going on in every port. There is a Chart for every port in France. Up and down one side of the Chart is a list of individual cargo items to be unloaded, such as lumber, coal, forage, railway supplies, foodstuffs, clothing, Quartermaster's supplies and construction material. A black line radiating from each item means its Receipts; a red line indicates the progress of the Evacuation of those Receipts. If the black line is longer than the red it shows that cargo is piling up at the ports. If these lines are the same length all is well and the stuff is moving out, which means no congestion. These lines are marked off in days and

weeks. This is what might be called the Tonnage Movement Chart. Then there is a Chart which shows the work of all ports in items, days, weeks and months. From this you can see almost in a second if labour is doing its full job or where it is falling down.

The same system is used to show the work of the troop transports. On a huge chart you see the name of the ship, the length of time it stayed in a French port indicated in black; the time on the ocean in red, and its stay in the American port in green. From this chart you can tell that the average "Turn Around" of some troop transports has dropped from 68 to 35 days. A similar system shows how the "Turn Around" of cargo ships has been reduced from 91 to 71 days, while the round trip of animal transports has decreased from 84 to 60 days. These statistics not only indicate efficiency of effort at the ports, but form the basis of future tonnage arrangements and for the allotments of labour.

These charts—and the many more that I could describe—enable G1 to know at all times just how the whole unloading situation stands and on this situation, so intimately linked with the tonnage problem, depends the life, the security, and the success of our cause abroad. G1, I might add, has a representative in every Division and Corps in the field and at the Headquarters of each of the Armies. Everywhere its major task is to procure what those forces need.

You have seen how G1 deals with the whole trying tonnage allocation. Its task in this matter, however,

ends the moment men and material get to France. G4 then takes them up, establishes the priority by which they are distributed, and sees that they are delivered to their proper station. This means that if the Engineers need construction material more than the Signal Corps require wires or poles, this material gets the right of way over the transportation facilities. It is up to G4 to maintain a saturated solution of all supplies in France and keep that solution liquid and moving.

Study the work of G4 and you find one of the most amazing details of our whole army situation. There is nothing like it in any of the many armies with whom I have been in contact in this war. It is not only the stabiliser of the war machine, but it is likewise the door before whom all the complications and anxieties of the A. E. F. are laid. Its long arm reaches everywhere; it dwells with both the working and fighting armies; it is the regulating station for army policies—the Great Shock Absorber. Apply G4 to any great American Corporation and it could pick up the threads of its activities overnight and carry them on to success. Like the host it succours it is tireless and sleepless. It must meet every emergency without batting an eye. Its story is a continuous record of dramatic event.

Last July, when the swift German advance menaced Paris, Brigadier General George Van Horn Moseley, head of G4 at G. H. Q., was on a tour of inspection in the field. General Pershing, as history now knows, had to hurl an army to the rescue and

in a sector which was far outside the prescribed and equipped zone of our operations. That heroic little army had to be fed and supplied and without delay. On the spot General Moseley devised a whole system of emergency supply which kept pace with that army and met every need. A half a dozen telegrams did the job. In one he converted a certain Intermediate Storage Depot into an Advance Depot, charged with the task of feeding and supplying this fighting army. Another wire established a new regulating station; a third marshalled ammunition, transport of all kinds and reserves at certain designated points. In less than twenty-four hours this whole emergency scheme to provide every kind of war sustenance was in working order.

The army wanted some ration carts. The Advance Depot wired back that it had none, and did not know where they could be obtained, whereupon General Moseley sent back a telegram which said in substance: "It is not material where you get them but you must provide them." They came up the next day. This is the way the G4 works.

Technically charged with "Construction, Transportation and Supply," its organisation is so compact that not a single army service in France escapes its ministrations. Division A deals with Supply, Equipment, Mechanical Transport, Remounts, Fire Prevention, Salvage Service, Graves Registration, Supply Statistics and Office Administration. Under it the Diary of Activities that is laid on General Hagood's desk every morning and which I have described, is

prepared. Division B deals with Troop Movements (not strategically but as a transportation matter); Billets and Billeting, Initial Equipment, Rents, Requisitions and Claims, while Division C has to do with Construction, Railway Transportation, the Army Transport Service, Labour and Priority of Shipment in France. Typical of the foresight of G4 is Division D, which is "Plans for Future Expansion and Development."

G4 does not physically carry out any of these many activities, but its task is to co-ordinate all of them; to see that they do not clash; to reconcile deficit with surplus; in short to keep the wheels turning day and night. If Construction is to be minimised it is G4 that finds storage areas; if freight cars are short it digs them up somewhere; if evacuation of tonnage in ports is behind Receipts it finds labour battalions to speed up the work. It is both Provider and Accelerator—a sort of glorified and many-sided Policeman to whom the American Army abroad tells its troubles.

Following the ways of the American business corporation, G4 has its Suggestion Box in the shape of a Suggestion Officer who is constantly in the field. He travels from Section to Section, investigating work and recommending plans for betterments, labour-saving or expansion. If he sees that switching facilities in a storage yard are handicapped he suggests additional engines; if he finds that working units can be consolidated he says so. All these suggestions are discussed in a meeting of G4 and if found feasible are at once put into effect.

At the head of the pyramid of G4 organisation sits the eagle-eyed and dynamic Colonel H. C. Smither, with a mind like a steel trap and an instinct for order that is almost uncanny. At his right hand is his no less energetic and big-visioned colleague, Colonel J. H. Poole, who went from the regular army into commerce, got all the benefit of Big Business and is back on the military job again. He is the Deputy Assistant Chief of Staff. Under their combined direction the remarkable Daily Supply State and the Daily Summary are prepared. These men, like the late E. H. Harriman, live a life that is geared up to the telephone and telegraph. There is not an hour of the twenty-four that the lights are not burning in the offices of G4 of the Services of Supply.

Problems of significant policy as affecting the whole Expeditionary Force are of course referred by Tours to the G4 of G. H. Q., which wisely allows its opposite number in the S. O. S. every latitude. The senior G4 at G. H. Q., however, is more actively concerned with the co-ordination of the supplies and the activities of the armies in the field who are so near at hand.

Where does Washington figure in this self-contained Service of Supply which links port with trench? It pays the bills and acts as Purchasing and Forwarding Agent. The cables bring the A. E. F. needs to a desk in the State, War and Navy Building, where Major General George W. Goethals sits as Assistant Chief of Staff in charge of Purchase, Storage and Traffic—a task infinitely bigger than what

confronted him at Panama. From that desk in turn radiates the process of Production and Transportation that fills the orders and sees that the goods go steaming to France. It involves the Control of Raw Materials, the establishment of Supply Zones and Warehouses in the United States; the scouring of the whole world of output and shipping—all to the end that our fighting man abroad is fed and equipped. And he gets what he wants.

We have followed supplies from contract to the borders of consumption; to that far-away domain where the genius of American organisation, now to be revealed, is fit comrade to the valour it sustains. We atoned for delay with thoroughness; we met that one-time rebuke with kindling performance.



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### III—*Army Tracks and Traffic*

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**B**ILL BROWN, who once drove a Santa Fe "Mogul" across the Kansas Prairies, hitched up his grimy khaki overalls and looked out of the cab of his monster consolidation locomotive marked "U. S. A.," which had left its Philadelphia maker less than a month before and which now panted alongside a quay at St. Nazaire in France. A scene of incessant action unfolded before him. In the lock basin was a forest of funnels and masts of American ships whose gay camouflage gleamed in the sunlight. From one of them a ninety-ton naval gun swung ashore as easily as a bale of hay; from another, five-ton motor trucks were lowered as lightly. Cranes creaked; the plantation melodies of the Sunny South, sung by negro stevedores, mingled with the song of Chinese coolies who formed a continuous line of cargo carriers from deck to dock.

In the yards nearby dozens of huge American engines, hauling endless chains of American cars, loaded with American supplies, snorted off to American depots, often on American tracks sentinelled by American poles down which flashed American messages sent and received by American men and women. Likewise for miles up and down the winding inland

waterways American tugs, pulling American boats, chugged along bearing their burden of American freight and responsibility. Day and night and with an effort as ceaseless as the tide of tonnage that beats on those stricken shores of France, is the movement of American freight and transport over there.

What was happening in the port that made Bill Brown blink his eye and breathe a little faster was happening in more than half a dozen ports along that same French coast with varying degrees of variety and volume but always with the same unending action. Again we are confronted by a miracle of expansion. In January of 1918 we were unloading 162,000 tons a month; in July this had grown to 694,000 tons. As late as March we thought that landing 60,000 troops in France was a big thirty days' record, yet in July exactly 301,000 stepped ashore. Men and material were handled, supplied and, what was equally important, transported to their proper destination.

It is all made possible by the Empire of Transportation whose teeming docks, tracks and traffic constitute one of the marvels of our overseas effort. Over it is laid the strong hand of compact organisation; galvanising it is an energy typically American in spirit and execution. At the throttle is an all-star cast of famous railroad and steamship officials whose united salaries in times of peace would almost float a big city's allotment of a Liberty Loan. Yet they toil in France for a Major's or a Colonel's pay.

In the preceding chapters I tried to describe the

general scope and structure of the Services of Supply which feed and equip the fighting man. It showed the whole close-knit system that binds the World of Output to the Domain of Consumption. We are now up to the all essential intermediary process of Distribution. Before that avalanche of supplies can move from sea to gun and stomach there must be a system of adequate transport. We will now journey along its rails and canals for the second phase of the amazing institution that American enterprise has set up in a foreign land and which furnishes the arteries of the United States of Supply abroad.

Here, as with every other American activity in France, we had to build literally from the ground up. As soon as we went to war it became evident that the success of our armies overseas would depend upon the manner in which they were moved and supplied. Hence Transportation loomed up at the start as a vital factor. The difficulties that lay in its way were many. After three years of war the wear and tear on the railway facilities of France, and without adequate renewal, were terrific. Forty per cent of its leading road—Le Nord—was in the hands of the enemy. Every ocean gate-way of any consequence was in continuous use. The six largest Channel ports were occupied wholly or in part by the British, and therefore could not stand the strain of added American tonnage. Besides, if we were to do our full job abroad we had to have our own ports. To move our armies and the necessary quantity of subsistence and equipment for their upkeep engines, cars, ter-

minals—a whole railway system—had to be reared. All this required organisation, labour and the wherewithal to build and operate.

Almost with our declaration of war we realised this enormous transport responsibility. It was an expert job and had to be blocked out by experts. Before General Pershing and his Staff set out on their historic journey to France to plant the American flag on the soil of freedom a Railway Commission, named by the Secretary of War with the aid of Mr. S. M. Felton, sailed from New York to investigate dock and traffic conditions and recommend a plan for the American system. The senior member was Major William Barclay Parsons, an eminent engineer who had constructed the first subways in New York. The other members were: W. J. Wilgus, who had been Vice-President of the New York Central, who had, among other things, laid the plans for the electrification of that system and who had been commissioned a Major in the Reserve Corps; Captain A. B. Barber, of the Engineer Corps, United States Army; W. A. Garrett, who had had wide experience as a transportation official; and F. de St. Phalle, a motive power and rolling stock expert who was an officer of a great locomotive works in Philadelphia. They represented a combined experience that was an immense asset in their ramified investigations, which began at the War Office in London and practically covered every line of communication used by the Allied armies in France. The recommendations of this Commission, and more especially the de-

tails suggested by Major, now Colonel Wilgus, formed the basis of the whole immense and far-flung structure through which the life-blood of our armies in France rushes to-day.

That Commission found the available French ports and their docks already overburdened with tonnage and most of them with inadequate and obsolete equipment. The four great strategic railways of France, running from the North to the South, were carrying nearly all the traffic that the rails could bear. Even the canals were blocked. France's man-power was nearing depletion, the available sources of supplies well-nigh exhausted. It all meant that America would not only have to construct but also bring her labour and material from home.

One of the first acts of the Commission therefore was to cable for Engineers. Thus it came about that in the vanguard of the millioned fighting host that later crossed the sea came those gallant Engineer regiments who have recorded in France an epic of achievement that must stand out as one of the brilliant performances of the whole American Expeditionary Force.

Nine Engineer regiments were sent. Five were for Railway Construction; three for Railway Operation; while the third was a Shop regiment. They were recruited from railway cab, switch, round house and shop. Every man was a volunteer. Some of the units went straight to France; others by way of England.

Five of the regiments marched through London on

that historic August day of 1917 when Britain got her initial view of our men in khaki and when for the first time an alien army, under its arms and flags, paraded the British capital. Whitehall, Regent Street, Pall Mall, Piccadilly—indeed all the heart of London—were aflutter with American flags and noisy with a deafening crash of cheers. I saw those five regiments march past King George as he stood at salute in front of Buckingham Palace—an unforgettable spectacle in a war that has given me some memorable pictures. As those stalwarts swung along a British Major General who stood by my side, said to me:

“Those regulars of yours march well.”

“They are not regulars,” I replied. “Six weeks ago they were running locomotives, building tracks, or operating lathes in the United States.”

“Extraordinary,” was his response.

That parade through London was the last spectacular appearance that the American Engineers made. Henceforth from battlefield to dock they were to toil as no labourers have ever toiled before. Even their departure from England had its dramatic touch—a suggestion of that famous episode “in Belgium’s capital” before Waterloo as told by Byron in “Childe Harold.” In London was Charles G. Dawes, former Comptroller of the Currency and now Purchasing Agent of the A. E. F. in France. He had left his bank in Chicago to become a Lieutenant Colonel—he is now a Brigadier—in one of the Engineer regiments. He gave some of his fellow officers a dinner

at the Carlton Hotel which was to be followed by a theatre party. Part of this regiment had been assigned to the British Army in France. As the Americans sat at dinner a hurry-up call came from the War Office to depart for the front early next morning. "All right," was the response. "We will be ready." The port from which they were to embark was a three-hour journey by rail from London. Colonel Dawes chartered a fleet of taxi cabs and saw his social programme through. The next morning these officers, having journeyed from midnight to dawn by motor, were on hand to leave with their men.

Within a week I saw some of them laying track under fire up the Somme. It was a group of these Engineers who, in that first great battle before Cambrai when a British Army was well-nigh overwhelmed by numbers last year, threw away picks and shovels, grabbed guns and leaped to action. It was another company of the same unit who, when the fate of Amiens trembled in the balance last spring, did the same heroic trick and became part of Brigadier General Carey's famous "scratch" army that saved that day so full of other disaster to the Allied cause. Such is the spirit of the American Engineers who built the foundation and much of the structure of our transportation system in France; the type of organisation a detachment of which laid nearly three miles of narrow gauge railroad in seven hours while two companies built two warehouses containing 40,000 square feet in eight hours and a half!

Go to any one of the ports that we use in France,

and you will see the results of their labours which began with bare hands and improvised tools. For the sake of illustration I will use two major ports. The first—Base Section Number One (St. Nazaire)—is that historic one-time fishing town which will always be bound to the United States by sentimental ties and where the first American Expeditionary Force set foot on French soil. In August, 1917, the whole dock and unloading facilities were not only hopelessly inadequate for our needs but the prospect of increasing them was equally disheartening. Although there were two large lock basins the anchorage outside was inadequate, while the discharging facilities were lamentably poor. Only six ships of 10,000 tons each could be discharged simultaneously. The dock buildings were old and rat-ridden; there were a few rusty cranes; the beds of the railroad tracks alongside had bogged in the wet ground. We had no barges for lightering. When our first locomotives arrived in a deep-draught ship we had to use an ocean-going steamer for a lighter; transfer the engines to her deck and then bring them into one of the basins in this crude and cumbersome way. Such were the handicaps under which we laboured for months.

But those Engineers got busy and they made the miracle happen. At the outset a discharge of 2,000 tons a day was considered an immense performance at this port; in October that same port discharged exactly 12,000 tons. We had not only rebuilt those tottering warehouses but in this port and in the great



Base Supply Depot at Montoir, four miles away, we had constructed fifty great warehouses that comprise a City of Supply. We have linked those docks and warehouses with more than a hundred miles of tracks and spurs—some of them on concrete road-bed. The project has a trackage equal to that of Altoona, which is a nerve-centre of the Pennsylvania system with two hundred and fifty miles of rails. We have increased the basin facilities until to-day there are berths for twenty-one ships of big tonnage. Fourteen vessels can discharge at the same time.

The A. E. F. in France, with the Pershing foresight that made our whole achievement possible, always looks ahead, and there is now in course of construction an American pier nearly 4,000 feet long, built on American piles, that eventually will accommodate sixteen vessels. The way I saw this pier driven far out into the river day after day with amazing rapidity made the French sit up. Accustomed to putting down massive concrete foundations, they stood speechless at the spectacle of American piles pounded in at the rate of two hundred a day. We drove twelve to every one that the French could put down. Not content with working these wonders on quay and road-bed, our Engineers have installed a complete water supply for the town, which meant the construction of complete waterworks and a pumping station with a capacity of 6,000,000 gallons a day. A 500,000-gallon reservoir was simply one feature of the project.

You are not surprised when I tell you that two

those myriad difficulties hedge in those gallant men in khaki. To begin with, the land was swampy and low, filled in with silt, mud, garbage and the decomposed refuse of a camp of Anamites, the Indo-Chinese coolies who are employed as labourers by the French, British and American armies in thousands. Hip-deep in this frightful filth our men toiled all through the bitter winter of 1917-1918.

The French said that it would take three years at least, possibly five, to build these wharves. It took those Americans less than eight months, and this meant the rearing of nearly a mile of docks, washed by the highest tide in France; the erection of concrete platforms with four lines of tracks; eight immense warehouses; the installation of ten electric five- and ten-ton cranes which straddle these tracks and lift huge parcels ranging from bundles of cases of canned goods to whole motor trucks direct from ship to car. Nearly 7,000,000 cubic feet of lumber, most of it brought from the United States, were used in this enterprise. That sea of filth and swamp and garbage is now a whirlpool of action—a miniature Duluth—that rings with the riot of a mighty tonnage handled without delay. Where once two ships were unloaded in a week fourteen American vessels—a thrilling sight as they stretch out in unbroken line, a rebuke to German submarine perils—are now discharged *at the same time*. A ceaseless stream of supplies flows from their hatches.

I have only presented one side of the construction picture at this port. Nine miles away at St. Sulpice

and where a year ago stretched hundreds of acres of farm and vineyard, has risen what may well be called "The City that Grew Over-Night." Here has arisen another one of our enormous Base Supply Depots (you will read more of them in the next chapter) with a million and a half feet of covered storage space and three million feet of open storage in use. Linking this community with port is another system of tracks and switches—that whole net-work of railway receiving, classification and departure yards that are such a necessary part of our whole supply system. Once more you have the marvel of labour expansion, for the forty original stevedores of last autumn have grown into the army of five thousand that toils night and day. At first these labour battalions slept in tents, in the open air, anywhere they could lay their heads. Their spirit of sacrifice is only equalled by that kindred spirit of self-effacement of this regiment of Engineers (which includes hundreds of college men working with axe and spade) which went to France to build railways and which has done everything from installing plumbing fixtures, shower baths and bakery ovens in camps to building docks, dams, fire stations and hospitals. This unit, and the work it has done is merely typical of what all the Engineer organisations have done, was originally in command of Colonel J. B. Cavanaugh; who left that battleground of pick and pile to become head of the no less important, if less physically exacting, G1 at the Headquarters of the S. O. S.

In this necessarily brief and bird's-eye view of what

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we have done in these two ports you get an idea of what has been going on in various ways at the others that we use. Everywhere we have dug and dredged; laid down tracks; built warehouses; set up machinery; all to the end that ships could be berthed and their cargo unloaded.

But this was just the initial phase of the larger traffic task. The men and freight had to be evacuated from the ports and sent to depot, camp, project and the front. We had to have a transportation system all our own and, once launched, it followed with a rapidity that almost rivalled the growth of the seaboard facilities. Summed up here is what has happened:

On July 1st, 1917, it did not exist. Twelve months later saw it complete in every working department and operating a system of railways larger than any important group in the United States. It handles tens of thousands of tons of supplies at many ports; owns hundreds of locomotives and thousands of cars all erected in France; repairs worn-out French, Belgian and its own equipment in enormous shops; has a personnel of over 1,300 officers and 40,000 men and conducts a canal system which vies with that of Holland. Starting with operations at a single port it is in full swing from the Channel to the Mediterranean. From a French train in charge of an American officer our supply-carrying scope has grown to an all-American train—crew, equipment, freight, everything Yankee except the rails—which runs from the sea to the borderland of fighting, a distance of 482 miles.

The complete operation of a French railway for both civil and military traffic by Americans is among the near possibilities of a war that has made the impossible possible.

Our whole transportation scheme in France was started right, because that original Railway Commission—wise in its foresight—realised that our railway structure overseas must be dominated by seasoned railroad men. British experience justified this judgment. It was not until that Wizard of Traffic and Master-Doer in War, Sir Eric Geddes, had been taken from his desk as General Manager of the North Eastern Railway in England and ultimately made Director General of Transportation of the British Expeditionary Force that the light railways began to follow the trail of the Tommy and the whole war transportation proposition bristled with results. We therefore escaped the costly mistake of first entrusting our railways to soldiers without practical experience.

The beginning of our Transportation Department dates from July, 1917, when three members of the Commission—Major Parsons, Major Wilgus and Captain Barber—were assigned to the Chief Engineer of the A. E. F., then Colonel and now Brigadier General Harry Taylor, and instructed to formulate a plan. Major Parsons, however, got permission to rejoin his regiment of Engineers; Captain Barber was assigned to Staff duty, so Major Wilgus was left on the job and with only one assistant—Captain L. A. Jenny, who had left the New York

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Central Railway to accompany General Pershing to France.

Under conditions as picturesque as they were remarkable was the birth of this system. In a back room of a building at 149 Boulevard Haussmann in Paris, then the Engineering Headquarters of the A. E. F., using an army packing case for a desk and seated on an empty starch box (for there was practically no office furniture) Major Wilgus, aided by Captain Jenny, prepared what is technically known as Requisition Number Six—the first definite step toward the creation of that far-flung steam-driven organisation which to-day links up all our whole overseas ports. This document was a Bill of Material, in terms of gauges, units, initial stocks and monthly needs, for the equipment of a complete transportation system from spikes to locomotives for an army of undetermined size and for a year in advance. Nothing just like it had ever been done before. It was based on pure assumption backed up by technical knowledge. Tribute to its accuracy is the astonishing fact that it remains to-day the basis of the whole automatic railway supply for our Expeditionary Force. Expanded it could easily meet the requirements of a system equal to that of the Pennsylvania or the New York Central. Henceforth—as in the case of the Automatic Food Supply—it was only necessary to cable for quantities of supplies indicated on this Master Requisition. This document was cabled to America—oddly enough—on July 14th (Bastille Day)—a date memorable alike

in French history and also, by reason of this event, in the annals of railway transportation.

Meanwhile some step had to be taken to organise a working Department. The Lines of Communication (forerunner of the Services of Supply) had been established with Brigadier General R. M. Blatchford in command. Transportation logically belonged to his domain, so Major Wilgus was made a member of his staff as Director of Railways. Early in August, 1917, the first personnel came out to help him in the shape of a few draftsmen, stenographers and clerks. They were the outposts of that army of practical railroad men now in France who left jobs ranging from \$140 a month as a signalman to \$100,000 a year as President and General Manager, to do their bit abroad.

From the start General Pershing was convinced that the head of his railway system must be a man of large experience in managing commercial railways at home. In this belief he cabled to the Secretary of War on July 29th suggesting that the ablest railroad men in the United States be sent over. After a careful canvass Mr. Baker asked W. W. Atterbury, then Vice-President in charge of operations of the Pennsylvania Railroad, if he would go to France and undertake the all-important task of Director General of Transportation. Mr. Atterbury accepted; sailed at once, and arrived in Paris on August 31st. He found transportation plans launched under the direction of Major Wilgus, and not only endorsed them but declared that he was content to return to the

United States and leave the Director of Railways in charge. Since Mr. Atterbury had been sent by the Secretary of War Major Wilgus believed that the arrangement should stand. When the Chief Engineer communicated this desire to G. H. Q., General Pershing formally appointed Mr. Atterbury Director General of Transportation without military rank. Subsequently he was made a Brigadier General. The Commander-in-Chief asked Major Wilgus to join the General Staff. Mr. Atterbury, however, expressed his need of him so strongly that he remained in the work that he had launched as Deputy Director General of Transportation. Thus two strong men, each with a distinguished service, joined for the gigantic service that lay ahead.

General Atterbury brought to his post a typical American railroad training. Although a Yale graduate in mechanical engineering he rose from artisan in overalls in the Pennsylvania shops at Altoona to one of the supreme posts in the system. An organizer and an achiever, he at once made things happen, but not until he had found out what had to be done, how to do it, and what help was needed. His first action, therefore, was to take a trip over all the railways and ports that we were to use.

As a result, and to declare a general working policy, he approved a plan adopted in the early days which committed the American Expeditionary Force to running its own trains made up of American locomotives and cars and manned by American crews under trackage rights over French railroads by sev-





BRIGADIER GENERAL W. W. ATTERBURY  
*Director General of Transportation, A. E. F.*

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eral routes from the sea to the front, which meant, all lines considered, a distance of six hundred miles. This remains the scheme under which we operate. At the same time the Light Railways which are really part of the operations of the Combat Army were put in charge of Brigadier General W. C. Langfitt, while the control of Roads fell to Brigadier General J. H. McKinstry.

The "D. G. of T." (as the head of Transportation is called for short) was now free to concentrate on the standard gauge steam job. His ideal was to create an army railway organisation just like any American commercial railway system, and this is precisely what he has done in every detail from top to bottom, including a Lost Baggage Division. To-day it only differs in all major respects from the Harriman or Hill systems in that it does not have to solicit business and has no financial worries. Other anxieties, however, make up for this immunity from money troubles. It meant having a President, Vice-President, a General Manager with all necessary aids charged with operation, maintenance of way and equipment; a Business Manager to look after fiscal matters, and a Chief Engineer for design and construction.

With the approval of the "C. in C.," General Atterbury filled these posts with live railroad men of his own choosing. Now came the first appearance of an All-Star Cast in the Great Drama of American Railway Operation in France. J. A. McCrea, son of the late President of the Pennsylvania Railroad, retired from the General Managership of the Long Island

Railway to become General Manager of the American Army system abroad; C. M. Bunting left his desk as Comptroller of the Pennsylvania to be Business Manager; and H. C. Booz went from Assistant Chief Engineer of the same system to become Engineer of Construction over there. M. C. Kennedy changed from the Presidency of the Cumberland Valley Railroad to be Deputy Director General of Transportation in England, where our troop and freight activities were soon to be extensive. All four were made Colonels soon after their arrival and merged into the military establishment. With General Atterbury, and Colonel Wilgus, who had been promoted, they formed the small group that evolved the whole system of American transportation abroad that has met every one of the five expansions in the numerical scope of our forces abroad.

Handicap, which was synonymous with our whole early effort in France, at once took up its abode with the "D. G. of T." He faced complications, both physical and temperamental, that tried the soul, harried the patience and made every test of tact, resource and ingenuity. We had to haul supplies at once, so the first trains were sent out with French cars, French equipment and with an American officer in each Section.

To understand General Atterbury's problem, you must know that fundamentally our whole transportation system in France had to be built around our supply system. General Pershing, at that historic meeting in the Rue Constantine where the A. E. F. was

born, had decided with his advisers that a ninety days' reserve of supplies must be kept in France. It is divided into three Sections. Forty-five days must be held at the Base ports; thirty days in the Intermediate Section, and fifteen days in the Advance Section. Thus the whole fabric of traffic had to bend to this all-essential end, which meant the safety and success of our cause overseas.

The difficulties that lay in the way of swift American-like operation were many. First of all were those four great national strategic railways that run from North to South. They were laid out to expedite troop movements to the frontier, especially the German. The American front was to be in a part of France which, to be accessible to us, necessitated the crossing of these vital arteries. Our feat was to cross but not to impair them. Hence we had to dig under or build over them. So far it meant the construction of over 600 miles of switches, bridges, tunnels and cut-offs.

This was only one obstacle. All French trains are switched *at* stations; we do this job outside the stations. French cars are all hand-braked and coupled, while we use the air-brake both for coupling and stopping. The French currents of traffic, like the British, use the left-hand track where we use the right. French signals differ from our own in many respects. The only thing that the two systems had in common was the fact that red was universal signal of danger. To cap it all, French car control, that is keeping track of

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freight cars, as compared with our arrangements, was crude to say the least.

In addition, our men had to buck the French language and French customs, which was about the hardest job of all. The French railroad employé, in common with his brother in city shop, takes two hours for his sacred *déjeuner* in the middle of the day. When our railroad hands came along with a dinner pail that was literally emptied on the run they thought we were savages. When we tried to get similar action out of the French there was almost a riot. Thus you see that our railway pioneers had some difficulties to face.

General Atterbury found that the French railways were in a surprisingly good condition considering their incessant usage since the beginning of the war. What was even more astonishing, they were capable of standing more traffic than was being put on them. But they lacked equipment. This meant that we had to have our own tools of traffic. Fortunately that famous Requisition Number Six was already at work and the rolling stock began to arrive. It is all knocked down in America for shipment and must be erected in France. We had to find or construct shops, and all this took much time and more worry. But the wheels were soon whirring and a phenomenal progress has been achieved. We have reached the point where we now average the erection of five 110-ton locomotives a day. Already we have 1,000 Consolidation American engines in France, and we have ordered nearly 2,000 more. In addition to these, we have acquired 240

Belgian locomotives that were run out of King Albert's country when the Hun invasion began.

No less remarkable is the car erection record. On September 1st, 1918, we had over 7,000 American cars in France, including box, flat, gondola, tank and refrigerator types. During the first fifteen days of August we averaged a daily erection of 70 cars and on one day 139 were put up and sent away on their own wheels. The average American freight car that we use in France is 30 tons capacity, while the average French has only 10 tons. The American locomotive averages 110 tons; the French 60. The drawing power of our locomotives startles the French, especially when our great engines haul loads of 1,500 tons as easily as their engines pull 100 tons.

On top of this erection we have to build yards, terminals, sheds, switches, spurs, water tanks, sidings, ash dumps, coal pockets—the many accessories that go to make steam transportation possible. It has meant a continuous activity that touched every phase of transportation.

All this needed a vast personnel both for construction and operation. Those pioneer Engineer regiments who came over at the first call for service had to be supplemented by many thousands of men representing a varied technical experience. You get some idea of personnel needs when I say that to operate a railway system for an army of one million men the full working transportation complement is exactly 63,034 men, which includes 8 Stevedore regiments, 4 Operating regiments, 2 Maintenance of Way regi-

ments, 1 Maintenance of Equipment regiment and 4 Car and Shop regiments. This personnel is organised in battalions by classifications, which include Engineers, Conductors, Train Despatchers, Yard Clerks, Flagmen, Firemen, Boiler-Makers, Switchmen, Blacksmiths and Boiler-Washers.

Where did all the operatives come from? Here is a little story which will tell you how one kind of employé was recruited. During the latter part of the summer of 1917 a big-boned fireman who had a regular run out of Laramie, Wyoming, heard some men standing on the platform mention the need of engine drivers for the American Army in France. This man, whom we will familiarly call Roger, was one year over the draft age, but that did not deter him. He had always wanted to go to France. He also hankered to get into the war. Here was his opportunity. When Roger got back from his run he went to the nearest recruiting station and enlisted. In the course of a few weeks he got to France, where he was classified as engineer. When they showed him the locomotive that he was to drive his guffaw could have been heard miles away. It was one of the little Belgian engines about the size of the tender of the little mountain engine he had used in his apprenticeship. He called it a watch-charm!

It did not take Roger long to master its kinks. The way he jerked the cars around the yards was both a revelation and a terror to the French. His fireman, who shall be known as Jerry, came from the Southern Pacific. He had seen some railroading



under war-time conditions because his run had been in and out of El Paso during the period of our mobilisation on the Mexican border. A few weeks after they had been doing the stunts with the toy locomotive in the freight yard at the French port a real American locomotive—the first in France—was set up. There was almost a knock-down and drag-out fight among the soldiers as to who should have this American engine. While the fight was going on, Roger and Jerry sneaked off, had an interview with the proper officer and then mounted the American steel monster. To-day they are pulling long freight trains over the heaviest run of the entire American railway in France. Both being single, they know every girl along the road, and there is always an affable chat with one of them every time they stop for water. Roger has sixteen French words in his vocabulary and Jerry twelve. But after the manner of the American soldier in France, they manage to get away with all necessary conversation.

Roger and Jerry have hundreds of prototypes in the army of railway operatives who daily cause consternation among the French in the way they handle trains. One day a block signal was set against an American freight train at a small town in the Intermediate Section. Half a mile away the engineer of the train saw how the block was set and that he had to stop. He was going at full speed, making time that fairly took the breath away from the French who were congregated at the station. They got the idea that he had not seen the signal and was going

to run through it. The result was that every native in sight began to wave everything he could lay hands on from flags to towels in a mad effort to stop the American train and avert what seemed to be an inevitable and disastrous wreck, because a passenger train was in the block. As the French viewed it, a miracle happened. Two hundred yards away the American engineer started to apply his air-brakes and pulled up at the station with grace and ease just at the very spot that the French wished him to stop. When the Gauls got their breath they were in that state of ecstasy and acclaim that only Frenchmen can develop over an artistic performance. They are still talking about it.

Roger and Jerry and all their mates who have come from practically every railroad in the United States to help win the war with throttle and switch in France had to study French methods. The way they grasped the complicated system is just another evidence of Yankee adaptability which is among the wonders of the war. Two Books of Rules were necessary. One, which we shall designate A, governs operations for the all-American trains and is all-English; the other—Book B—is for our employes engaged in joint operation with the French. The men in the main have to master both.

The first contains, among other things, a reproduction of all types of train orders, signals, block system rules, and a dictionary of transportation words and expressions ranging from engine to train regis-

ters. It also sets forth the fact that, so far as time is concerned, the Continental System is used.

Here we get to one of the toughest nuts that the American railroad man in France has been called upon to crack, because the French railway time tables use this Continental System—that is, 1 to 24 o'clock. This means that 3 o'clock in the afternoon American time is 15 o'clock French railway time; 11 p.m. American time is 23 o'clock, and so on. Thus the veteran engineer whose orders on the Union Pacific would have read: "Pass blank station at 4.30 p.m.," must adapt himself to a similar instruction in France which says: "Pass blank station at 16.30 o'clock." But like his *parlez-vous*-ing with the French girls, he again gets away with it.

Of course Book A is the easiest to digest because it deals with rules familiar to all American operatives. Book B, however, which is printed in both English and French—the parallel text is on opposite pages—is the hard one. It sets forth the regulations in effect on the Est, the Etat, the P.L.M. (Paris, Lyons & Mediterranean) and the P.O. (Paris-Orleans). These are the four great French railway systems to which I have already referred.

Dig into this little red Traffic Bible and you see at once how difficult is the job of the Yankee operator on these French lines. Scores of our engineers are running French locomotives that pull full complete French trains. Here is an illustration. On the Etat, P.O. and Est Railways, when the semaphore signal is located at a station where the train is required

to stop, the signal may be passed to make the necessary stop. On the P.L.M. there is no exception. The stop must be made before passing the signal. This is just one example of what Roger and Jerry must pack into their heads in order to avoid a conflict with rules which in France is as bad as a criminal offence.

So complete is our system of instruction that an American flagman sent back to warn a train in case of a wreck or unexpected delay in traffic, carries a complete set of cards printed in both French and English, setting forth the specific message that he must deliver. It all shows that we are taking no chances on having wrecks due either to carelessness, misunderstanding, or lack of knowledge of the French language.

The Transportation Department has schools for all ranks, and notably for the highly useful individual known as the Railway Transport Officer or the "R.T. O.," as he is more widely called. With the British he simply acts as a first-aid to passenger traffic, stamps railway warrants and helps troops as they pass through. With us, however, the R.T.O. has a dual capacity. He may be one of these passenger officials, or he may also handle a full-fledged traffic job at a Supply Depot or a Regulating Station. At some of these places as many as five hundred cars are handled in a single day. It is his work to see that trains are properly made up and sent on to their destination. Hence the School of Instruction must include a complete course in traffic and also a good dose of human nature. I asked a certain high trans-

portation officer in France what constituted the equipment of an efficient R.T.O., and he replied:

"Twenty-five per cent French language; twenty-five per cent railway knowledge; twenty-five per cent diplomacy and twenty-five per cent common sense."

To-day you can find an American passenger R.T.O. at every station of any consequence used by our troops all the way from the British Channel down beyond the Italian frontier. His freight brother is likewise hard at it at scores of places, often working twenty hours out of the twenty-four because supply trains must be kept moving regardless of sacrifice. Some of these men, like their Engineer comrades who toil with pick and shovel, perform heroic tasks.

Despite the almost unending demands made on their time and knowledge, they are not without their sense of humour, as the following report made by a new "R.T.O." to his Chief indicates:

"The following memo. of the first thirty hours of a new R. T. O. at a perfectly new station might be of interest. Station is Division Hdqrs. No R. T. O. has been here previously. The writer arrived at 6.30 p.m., and after one look at the congested yard and unloading space covered with every imaginable property, from cottonwood logs which predominated to barracks bags, he decided that supper and a sleep were necessary before further efforts were made. The diary of the day follows: 6.30 Petit déjeuner; 6.40 at yard handing out bull and cigars to the Station Master, who is by the way a fine old fellow; 7.00 a.m. assigned to an office the best there was, and a good one; 7.45 had two engines at work clearing yard;

8.30 paid respects to Commanding General and Chief of Staff and got assignment of a detail; 9.30 checked yard and arranged for detraining a solid train load; at 1.00 p.m. arranged for billet; 1.40 p.m. train arrives, 2.20 troops all out of station and train gone, 3.00 to 5.00 answering fool questions, 6.00 to 7.00 supper; 8.10 Train of troops detained and led to camp; 11.35 Train of troops detrained; served coffee and 'herded' to camp; 4.20 a.m. Train of troops ditto, only worse. Have been asked more fool questions in twenty-four hours than ever before. Now I will send some telegrams and sleep all of two hours. *It is a gay life."*

Still another evidence of the kind of drama that bobs up in transportation reports is in one, a copy of which lies before me as I write. It is a message from a train despatcher up near the front who is ordering a certain blank form. The reason that he gives is this:

"Lieutenant Blank interrupted while giving report. Said bomb exploded just then. Blew in window causing candle to set sheet on fire."

Behind this simple statement told in bald official fashion was a story of sacrifice and danger that would never figure in public report and never know recognition. The way of the railroad employé, whether in war or peace, is the way of obscure but heroic devotion.

The army of humble yard-men, engineers, switchmen and section hands who rushed to the railway colours is matched by the smaller but none the less patriotic group of higher officials who are part of

the transportation fabric in France. You encounter them everywhere. One day I saw a buck private standing in line at the mid-day mess to get his tin of "slum gullion," as the army stew is called. My companion, an officer in the Railway Transportation Corps, pointed to him and said: "That man left a ten thousand dollar a year railway job to enlist as a private at three dollars a month. He is now my orderly." It is not an unusual case.

Run the roster of our transportation officials abroad and you will see why I called it an All-Star Cast. It includes, in addition to those I have already mentioned, Colonel H. G. Maxfield, formerly Superintendent of Motive Power of the Pennsylvania Railroad; Lieutenant Colonel H. H. Adams, who was President of the Kansas City Terminal Railways; Lieutenant Colonel V. R. C. King, who was Terminal Superintendent of the Atlantic Coast Line; Lieutenant Colonel Neddleton Neff, once Division Superintendent of the Pennsylvania Lines West; Lieutenant Colonel H. J. Slifer, former General Manager of the Chicago Great Western; Major F. A. Delano, one of the best railroad men in the United States, and who left the Federal Reserve Board to join the army; Major F. G. Robbins, former General Superintendent of the Erie; Major G. T. Slade, who was Vice President of the Northern Pacific; Major H. W. Hinkle, General Superintendent Toledo, St. Louis & Western; Major E. B. Cushing, General Superintendent of the Southern Pacific Line; and scores of others, all content to toil at improvised rough board tables on occa-

sion instead of the mahogany desks over which they once presided.

At the head of this Empire of Tracks and Traffic is General Atterbury with his hand at the throttle. So complete and co-ordinated is the organisation that there is laid on his desk every morning a single type-written sheet a little more than a foot square which sets forth—and the figures are up to the preceding midnight—the number of ships in every port that we use in France; the number of vessels unloaded the day before; the tonnage discharged; the number of freight cars of all types that were unloading; the empty cars received; the barges shipped and the tonnage loaded on these barges; and a statement of weather conditions in every port. Attached is a brief résumé of the number of ships not being unloaded and the reason why.

This Daily Situation, as it is called, is just one more exhibit in the gallery of our army business efficiency. We can now go ahead and see how it is made up. It means a brief inspection trip over the system of the Transportation Department, now one of the Services of Supply, which means that its Headquarters are at Tours.

In a small room on the second floor of one of these weather-beaten buildings is the office of the Director General of Transportation. On the walls are those familiar blue-print charts of organisation which you find in the room of every department head of the A.E.F. Likewise, there are charts showing density of traffic. It means that with Transportation, just



as with Food and Mechanical Transport, everything is diagramed.

The D.G. of T.'s right-hand is the Deputy Director of Transportation—Colonel Wilgus—who exercises a supervision over all routine and which thus leaves the head of the system free to move about. Instead of using a private car as an American railroad President would use, General Atterbury goes about in a high-powered automobile, which enables him to inspect construction jobs right up to the point of pick and shovel and know what is going on up to the hour.

The work of every one of the important Heads of Departments is concretely charted. For the sake of illustration I will take the work of the General Manager. Under him are an Assistant General Manager, and also an Assistant General Manager in the Advance Section who is the link with the transportation of the Combat armies; a General Superintendent of Transportation; a General Superintendent of Motive Power; a Superintendent of Telegraph and Telephone; and an Engineer of Maintenance of Way. Various sub-departments include a Car Record Office, a Car Order Office, a Troop Movement Bureau, and a Lost Baggage Bureau. Under the General Superintendent of Motive Power of course come the various Shop Superintendents. Our whole system of railway operation in France is divided into five lines, known as the A, B, C, D and E lines—each one like the Pennsylvania Lines West of Pittsburgh, for example, with a General Superintendent. The list of

these various offices indicates the scope and the completeness of the all-important wing of the service over which Colonel J. A. McCrea presides.

The operation of his Car Record Bureau will show how we have revolutionised transportation methods in France. Up to the time of our advent French car control was a sad affair. The French had no organised or consecutive tracing of freight equipment. Every two weeks they had a sort of checking up, but there was no definite plan. Whole trains have been lost for weeks. Our number of freight cars was necessarily limited; like tonnage, everybody wanted all the cars they could get; we had to keep them in constant use, and this required in turn that we had to know where they were all the time. It meant highly centralised control to prevent duplication of orders. Here, then, is the system:

Every "U.S.A." car has a number which is part of a series. When a car is loaded at Base port or Supply Depot its number becomes a part of the way-bill. Henceforth that number is under constant scrutiny. At every station we have car checkers who report the location of empty and loaded cars each day. If a car is unaccounted for twenty-four hours a tracer is at once started. Every morning there is laid on the General Manager's desk a large sheet which contains, by stations, a report of cars delayed in excess of twenty-four hours. It not only indicates the type of car and its freight, if loaded, but the *specific cause of the delay*. Thus congestion can be relieved at once.

All our cars are marked: "Return When Empty to Port." This injunction has helped a great deal.

You can see the Master Car Situation on file each day in Colonel McCrea's office, which tells the whole story of why, out of 2,700 American cars handled in one interval, only 12 were missing on the whole Lines of Communication. Technically it is called "Report of Car Situation, Movement and Supply for Twenty-four Hour Period Ending Twenty-four O'Clock." It is a complete analysis of every car, empty and loaded, handled at every station on our system during the preceding twenty-four hours. On it you can see such items as the analysis of freights; the physical condition of the rolling stock (which is a most important fact to know); the loading work done by the various departments; indeed, every conceivable detail that contributes to the upkeep and operation of the 7,000 freight cars that we had in France at the time I write. These daily records are sent in each day by telegraph. In the United States it is done by mail.

In addition to all this every freight train is checked up and its record put on a card which contains the number of the train and the number of each car in it; the French road it travels on; the consignee; point of shipment; destination; and contents. On the card is also a list of every important station that it must pass. The train is checked up as it passes each station and the hour of the passing is recorded. When the trip is finished there is a complete biography of the journey. This card is kept for ninety days in

order to check up any questions that may arise in connection with the trip. After ninety days it is officially "dead" and is destroyed.

In the movement of troop trains you get a touch of dramatic interest. Here, and up to the zone of fighting, the controlling factor is our old friend G4, which is advised by cable by the Navy Department of the impending arrival of the convoys. G4 then, and at the direction of G.H.Q., instructs the Troop Movement Bureau where the troops are to be shipped. They may go into a billeting area or to barracks for rest and intensive training. A so-called Landing Officer accompanies each troop train from port to destination. Only a Blotter Record is kept of the movement of troop trains, for no permanent records are necessary.

It is not until our troops strike a French train—we use French cars for this transportation—that they realise the hardships of war. Our soldiers are carried on what the American would call a freight box car, labelled in France "*40 hommes et 8 chevaux*," which means "40 men and 8 horses." In trying to decipher this war-worn phrase many an American private has got his first real lesson in French. After he has travelled on the cars he begins to sympathise with the "*8 chevaux*."

The completeness of organisation which marks the General Manager's activities is equally true in the domain of the Business Manager. Colonel Bunting operates in precisely the same way he operated in his office in the Broad Street Station in Philadelphia. He

has to deal with Purchases and Requisitions; Contracts, Claims and Settlements; Statistics and Accounts, and a Record of Material. Colonel Booz, whose services were needed at home, has been succeeded as Chief Engineer by Lieutenant Colonel H. M. Waite. When I last saw him he was City Manager of Dayton, Ohio, and the first man to hold such a post in the United States. He had previously had a varied railway engineering experience. It was one of the many contrasts that I have encountered in this war to find him bulwarked by blue-prints in a little office in the Transportation Office at Tours. He prepares the plans and specifications for all transportation design and construction. The plans, with a list of material needed, are turned over to the General Staff for approval and then delivered to the Director of Construction of the Services of Supply for execution. The material is ordered through the Chief Engineer. The order goes to Mr. S. M. Felton, who is the Director General of Military Railways in the United States, and who, with his technical staff, becomes the Purchasing Agent of the transportation system abroad.

The whole Transportation Department moves like clock-work. Every service has a staff meeting twice a week which is attended by the Heads of Department. The list of subjects discussed at a typical staff meeting of the Engineers' Department included the following: Coal requirements; Lumber Dock at Bordeaux; Organisation to have charge of new cranes; General repair shop; Regulating stations; Additional

berths at Marseilles; Maintenance of Way material; Additional tracks at Montoir yards; Car movements; Plans for opening port at Cette; Facilities required at ports; Tugs from the United States; Development of yards at St. Sulpice; Return of steel rails to French. Everything is threshed out; there is no duplication. It all makes for team-work.

Search through the whole Transportation Department and you find every detail that goes to make up a well-operated system. The "Safety First" rules are typical. They grew out of the many fatal accidents to our soldiers through carelessness on trains. One hundred and twenty-seven American soldiers have been killed while riding on the tops and sides of railway cars. Hence you find all cars used by our troops placarded with as picturesque a set of warnings as was ever handed out for the safeguarding of human beings.

One of them reads like this:

"Your head may be hard, but not as hard as bridges and tunnel arches. Only six inches clearance between tops and sides of cars and tunnel arches and bridges. Don't ride on tops or sides of cars. The railway company will hold you responsible for damages to bridges and tunnels and signal towers. They are not insured. *Keep your block inside.*"

A second runs: "There are three kinds of fools: 1. Fools; 2. Damned Fools; 3. Soldiers who ride on tops and sides of cars. If you expect to see the next block keep yours inside."

A third warning says: "Huns are waiting in the

trenches ahead. Speed up. You won't if you ride on top or stick your head outside of cars. Keep your ivory in."

Still another one is: "War Risk Insurance: Keep inside; don't be a dead one; help to win the war."

If you want one final evidence of the thoroughness of our transportation system, I have only to add the story of the so-called "American Special"—a near de luxe passenger train that runs for the exclusive use of American officers every night, each way, between the Fighting Headquarters and the Supply Headquarters. Everything on it is American except the coaches, and they happen to be the pick of the best first-class cars in France. When this train is about to start the passenger hears: "All Aboard" in just the same vernacular, dialect and all, that he hears at the Grand Central Station in New York, the Broad Street Station in Philadelphia, and the Old South Station in Boston. As he approaches the car negro porters, in khaki instead of the familiar blue uniform and brass buttons, separate him from his baggage just as they do in the States. The best thing about it is that these darkies are real Pullman porters. Every one of them has had his share of railroading back home. He is a never-ending source of wonder to the French porter, who marvels at the dexterity he shows in making up beds for the night. One distinctive difference between dealing with these army porters and the porters in America is that the black boys on the "American Special" do not have their hands out for the customary tip which is such a necessary part of

American travel. Yet their service is just as cheerful and just as good. The tipless porter therefore is one of the rare exhibits of the war!

When the "American Special" idea was launched the purveying of porters became a problem. Where were they to come from? If there was any place, that place was surely the Stevedore regiments. Discreet inquiries were at once made, but the word soon percolated down the black and brown ranks that men who had had experience as Pullman porters were wanted. The response was astounding. Nearly every stevedore in France claimed to have had long and varied training in the Pullman service. They had visions of warm cars and easy work. A certain top sergeant was known to have been a porter veteran, and to him was delegated the task of picking out the twenty men needed. He was not to be fooled. The net result is a porter service that is one hundred per cent good. There is never a trip but that these soldier-porters recognise some one from whom they have collected quarters, half-dollars and even dollars at the end of long runs in America.



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#### IV—*From Ship to Shore*

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ONE all-essential detail in the structure of Transportation remains to be explained. It is the Army Transport Service, commonly called the "A.T.S.," which forms the link between ship and train or barge. Ask the average American soldier in France what the A.T.S. does and he will say: "They unload the ships." Yet no unit over there performs a task more significant or effective than this sleepless, tireless, eternally vigilant organisation which delivers man, beast and material to the steam and water carriers. It operates in every port that we use; on its work depends the flow of that vital American war factor, tonnage. Though it employs thousands of men and ranges in its activities from the Welsh Coast down to the shores of the Mediterranean, it is so efficiently co-ordinated that a man can sit at a desk at Tours and know every hour of the day and night just what is being done. Once more you have the spectacle of an almost uncanny centralised control.

The man at that desk, white of hair, and with a soft Southern drawl, is Lieutenant Colonel H. B. Moore, head of the A.T.S. His job really began back in May, 1917, when he was summoned from his steamship office down at Galveston to organise the transport unloading of the first Expeditionary Force. He has

been on the job ever since. He has seen that infant organisation of four hundred negro stevedores and twenty foremen, known as the Transport Battalion, expand into the army of labourers that he now commands. This work was originally part of the Quartermaster Corps, but was transferred to its logical domain, which is Transportation.

When our supplies began to pile into France the word went forth from Headquarters: "Keep the docks clear." Congested docks not only meant an interrupted flow of supplies all the way up to the front, but what was equally important, delay in the "turn around" of ships, and Ships in this war are Life. Hence the job of the A.T.S. is to unload ships as swiftly as possible and keep the docks ever ready to take on the unending stream of stuff that flows from America into France. How is it done?

As soon as a ship sails from the United States the Navy Department notifies the A.T.S. When that ship is in Mid-Atlantic it sends a further advice stating the draught and size of the vessel and the cargo in detail. If it is a transport it sends the number of troops and their classification. This information now forms the basis of operations. The A.T.S. must adapt the ship to one of the fourteen destinations that we have in Europe. This assignment is governed in turn by the rail transport out of the port; whether that port is congested or free; by the draught and size of the ship; the class of cargo (if it is explosive it must go to an isolated place); and also the special type of cargo. If the ship is carrying loco-

motives it must go to a port which has monster cranes. In the case of a troopship, the final destination of the soldiers often helps to determine the port. Thus, before the ship reaches France, the A.T.S. has assigned it to a port best equipped to handle its freight. By the time it is berthed the exact number of stevedores, machinery, and trucks are ready to empty its deck and burrow into its hold. Now you see why there is no delay and why we have been able to handle 50,000 tons a day.

An adequate Intelligence System is a vital factor. Between 12 and 2 o'clock every day Colonel Moore gets a long-distance telephone call from the A.T.S. Superintendent at every one of the eleven ports we used in France, and they range from Belgium to Italy. This report is a compact summary of weather and dock conditions. Weather is of course an all-important matter. If there are any usual events like accidents or wrecks they are all reported. Hence the Chief of the Army Transport Service is not only in constant touch with the situation, but he can constantly inform the whole A. E. F. about many things they want to know. If the Air Service, for example, calls up and asks: "When can we have some aeroplanes?" all that the officer at A. T. S. Headquarters has to do is to look up a sheet recording advices of incoming ships and he can at once say: "*Sierra* will arrive at Bordeaux to-morrow morning with a thousand tons of aeroplanes set up."

If you want to know just how the A. T. S. works, come with me on a little trip to Base Section Number

One. Here you will find the Superintendent of the A.T.S. installed in an office at the dock, where he can see the ships that he must work, hear the creak of crane and the rattle of truck. In this particular case the Superintendent is Lieutenant Colonel F. W. Green, short, stocky, alert, and a dynamo of energy. He left the General Managership of the Louisiana and Arkansas Railway to do his share in France. He runs that port just as easily as he once operated 1,300 miles of railway back home. In his pocket is a loose-leaf memorandum book on which is typed the name, length, draught, the heaviest package aboard and the itemised cargo of every ship that he must unload. He has gotten these facts by wire from the Director of the A.T.S. Part of his task, therefore, is to arrange for a suitable berth for the ship. He must have a crane or derrick for that heaviest package if it is an engine or a steel girder.

On a large black-board before him is a diagram of the lock basins. Each berth has a number. Alongside each number is written in chalk the name of the ship unloading there. Thus he can see at a glance just what is going on in his bailiwick. As soon as the ship is unloaded its name is wiped out and another is written in.

In addition there is a black-board in the office of the Assistant Superintendent, which is a sort of working register. This deals with the concrete details of unloading. It contains the number of the berth, the name of the ship alongside, the unloading officer in charge, the number of hatches working, the number

of labour gangs on these hatches—in short, the whole daily programme.

The labour battalions, that is, the stevedores, are divided into gangs. There is one for each hatch, with a sergeant in charge on deck, while a corporal looks after the men working in the hold. There are three labour shifts of eight hours each. To quote Colonel Green: "We work twenty-six hours a day, that is, twenty-four for unloading and two for cleaning up!" These, I might say, are the regulation army hours.

A constant scrutiny is kept on these labourers. For every seven ships being unloaded there is a Chief Travelling Stevedore, who is a sort of official black speeder-up of his fellow workers. He goes from ship to ship. In order to stimulate the stevedores, they are given special leave after they have made a particularly good record. Theft, breakage of packages due to carelessness and "soldiering" are punished with the rock pile or worse. A friendly rivalry is developed between these labour gangs which makes for good results. This is one reason why this particular port unloaded 10,341 tons in one day.

Watch the unloading of a group of American ships in a French port and you behold a sight that at first seems to be one of utter confusion, so deafening is the din and so incessant the movement. There is a constant procession of labourers from hold to dock; motor trucks, boxes, machinery and raw material appear to pile up from nowhere. Yet it is orderly chaos. Every case of canned goods that comes ashore is checked up and becomes part of the daily record. Not

a pound strays or gets lost in the tumultuous shuffle. There is a checker on the boat and one ashore. Frequently, and notably in the case of ration components, the goods go direct from ship to freight car which stands on a siding at the dock. This saves rehandling in the warehouse. This process, technically called Disposition, means that the cargo goes direct to consumer, which is the army, without storage. Where there is an exceptionally large consignment for one Service a representative of that Service is at the dock to see that it is sent at once to its proper destination. This is especially true of motor transportation and Quartermaster stores. Motor trucks and cars are made up in trains and sent at once to the Reception Parks which are always near the quays. The whole rule of supply in France is to get the stuff from where it is plentiful to where it is needed and with the minimum amount of labour.

All this many-sided and unending dock effort is put down on paper. On what is known as the Daily Report of Dock and Shed Operations you can see the location of the work, the tonnage unloaded from the boat, whether it went direct to cars or to trucks and barges, or was left on the dock; the total tonnage handled in terms of troops, animals and materials; the number of man hours used up in handling the freight and the average tonnage per man per hour. Likewise, and in a no less comprehensive document entitled Daily Report of Boat Operations, you can read every night the complete record of what was done with every boat on which labour was employed. You get first

of all the name of the boat; the port from which it sailed, the time of its arrival outside and the time of its docking, its draught, number of cargo hatches, the exact cargo aboard both in specific items and tonnage, and the whole unloading record. In addition you get its complete Outward Movement, the ballast employed and whether it took back to America any troops or passengers. Even the state of weather during the ship's stay in France is part of this remarkable chronicle. When you have finished reading one of these reports you know the complete history of that ship and its cargo from the time it left the port "Somewhere in America" until it sailed back from "Somewhere in France."

But this is not all. That great mass of freight must be transferred to car and barge. Hence there is a Daily Report of Car and Barge Movement, which specifies the exact number of freight cars or barges loaded and the specific freight together with the destination. The work of the A.T.S. so far as the actual tonnage is concerned ends when men and material go speeding inland-ward. Once outside the Port Area the railway or canal service authority begins.

Apropos of this canal service let me say that here is a branch of Transportation that grows steadily in importance and usefulness. On its four hundred miles of water-ways we have more than 600 men afloat in charge of tow-boat captains who have come from American canals that range from the Erie to the Panama project. Evidence of the approaching magnitude of the Service is the fact that fifty concrete oil-burning

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tow-boats are under construction for the A.T.S. in France. Fifteen ocean-going tugs crossed the Atlantic to join its fleet.

Buried in the formal records of the Army Transport Service are many dramas in achievement—romances of heroic effort that are as kindling as any narrative of fighting at the front. They are shot through with the thrill of combat with wind and rain and circumstance. Let me disclose two of them that will make every American feel just a little prouder of his national kinship with the men, white and black, who made them possible.

One day a great fleet of troop transports—in reality two convoys—carrying over forty thousand men appeared outside Brest. The port had a normal debarking capacity, with camp accommodation ashore, of thirty thousand men *a month*. It was in the early days. There were no docks; the soldiers had to be lightered. “Can you unload these men in ten days?” was the proposition put up to the Superintendent of the A.T.S. In exactly forty-eight hours afterwards every man was walking the soil of France. Colonel Green, the live wire now in charge at Base Section Number One, is the man who turned the trick. He did it—for one thing—by making a bridge of a flotilla of French ships in the harbour. He even commandeered tugs, barges, anything afloat that would carry a human being. That enormous convoy did not find camps and kitchens ready for them when they set foot in France, but they got off their ships in less



than one-fifth the time that they expected to land and they were ready to go up the line.

Here is its twin performance. One of our ship problems has been the coaling of the monster *Leviathan*, once the Hamburg-American liner, the *Vaterland*, which must take aboard 4,500 tons of coal and 2,000 tons of water every time she touches port. On two occasions she was hung up for forty and sixty days. This was a waste of precious troop carrying power. She was sent to Brest and the instruction to the A.T.S. was: "The *Leviathan* must be turned around in two weeks."

Once more Colonel Green met the emergency, for in eighty-four hours after that reformed German ship poked her nose into port she was on her way out again fully fuelled and watered. In this case Yankee resourcefulness, spurred on by an indomitable energy, worked the miracle. Colonel Green, who had ample advance notice of the coming of the great vessel, swung specially made platforms all around her sides. This enabled him to work a much larger force of labour than the ordinary coaling facilities permitted. Then, with a keen sense of labour psychology, he started a rivalry between the Army and Navy gangs as to which could get the most coal aboard. Pitted against each other they performed prodigies. The best commentary that I can make on this astounding triumph of American methods is to say that this record beat the best record in Germany by exactly forty-eight hours. In other words, it took a hundred and thirty-two hours to coal the *Vaterland* in her home

port under ideal conditions. Such achievements as these, and they are merely typical, are simply part of the day's work of the Army Transport Service.

This World of Tracks and Traffic which pulses with movement must be linked with swift communications. At this point we touch the Signal Corps which has a leading part in the whole vast scheme of our effort in France. Its telephone and telegraph lines not only bind up the Services of Supply but reach to the observation posts that look out on "No Man's Land." There is seldom a list of awards of the American Distinguished Service Cross without a citation of some signaller who crept out under fire to repair a wire or who kept his telephone working under a hell of shells.

With the Signal Corps you are face to face with what amounts to a large cross section of the American Telephone & Telegraph Company planted overseas. You see telegraph rooms that rattle like machine guns and with multiplex systems that send eight telegrams at one time over the same wire; you find yourself in complete telephone exchanges operated by nimble-witted American girls. Over the five-hundred mile length of our service we send what amounts to 90,000 ordinary telegraph messages a day, which is equal to the commercial telegraph business done daily in a city the size of Philadelphia. In one place—Tours—we duplicate the business that Baltimore does every twenty-four hours. We register more than 1,800 long distance telephone calls a day or as many as are put in each day between New York and Boston.

In addition there are 400 long distance calls a day on our leased wires. To do all this we use 18,000 miles of American strung wire. We also lease 36,000 miles of French wire, which makes a total of 54,000 miles of wire owned or controlled by the American Expeditionary Force.

At the head of this net-work of nerves is a smooth-faced, grey-haired man, Brigadier General Edgar Russel, who was in at the birth of the system in France. As in every other activity, Signals faced many obstacles. The European apparatus does not fully meet the needs of the American Engineers. The French telephone, as every traveller knows, is one of the penances of modern times. Try to get a call in Paris—it is much worse in the provinces—and you atone for all your sins. We had to bring over everything we used but the poles and we had trouble in getting them.

The American Telegraph Battalions who vie with the Transportation Corps in versatility and sacrifice, have become a familiar sight in rural France as they sit astride poles or dash up and down the roads in their emergency wagons. We have a complete system of pole patrol because these wires must be up and doing all the time. Every American pole is numbered and branded "U. S. A." It gives you a friendly feeling to see the unending procession of them as you motor along the highways.

The really fascinating detail, however (this adjective is not without its literal meaning), of the Signal Corps is the human side. I mean of course that

gallant band of nearly two hundred American women who operate the switchboards and who have displayed a courage that has had more than one actual test. One night when Paris was under a rain of air bombs and when men rushed to safety, the American telephone girls on duty were asked to leave their posts and seek the "*abri*," which is the official "shelter." Just then a window in the room was smashed by a shell fragment, yet those hello heroines remained at the switchboard. "We will stay until the last man leaves," they said. This is the fibre of the enlisted sisters of our fighting men.

They are a hand-picked crowd with as fine a sense of service as ever animated combat troops. For the original contingent the two main qualifications were a knowledge of French and telephone operation. That was when we had to use French wires. With our complete all-American system now the French requirement is incidental. Those pioneer operators had to be trained in the United States. The majority of them were college girls, keen of mind and with an immense capacity for work. Go to any one of our switchboards in France and you can see a Wellesley graduate seated alongside a girl who has had to make her way from childhood. In this service, like the "Colonel's lady and Judy O'Grady," they are all patriots "under the skin."

The telephone operators wear a smart blue uniform with a blue aviator cap. On the left sleeve is a white brassard indicating position. The operator's badge bears a telephone transmitter; the supervisor's, a trans-

mitter in a wreath; the Chief Operator at a station, a gilt transmitter in a wreath surmounted by a static. All our women rank as civilian employées of the A.E.F. For safety and comfort there are never less than five girls in any one place. They are always in charge of a Supervisor and usually live in a Y. W. C. A. hotel.

But telephone and telegraph is just one detail in the larger work of the Signal Corps. Although Aviation—once a part of it—has been made a separate service it has many other vital functions. Modern war has proved the value of the Radio. Hence wireless is an all-important function. It is part of the duty of the Signal Corps to intercept both enemy and neutral wireless messages. Some of the latter are as dangerous to our cause as those of the Central Powers. We have regular Intercept Stations for this work. Then, too, the Signal Corps operates the whole Carrier Pigeon Service. These little white birds have saved the day on more than one occasion. Likewise the Signal Corps operates a complete Weather Service. Air fighting depends upon weather conditions. It is the duty of these prophets to make daily forecasts of meteorological conditions upon which so much depends. Scientific inspection of all apparatus is another work. If a telephone transmitter is packed, for example, the service is impaired and this deficiency may spell defeat. All official photographs of the A.E.F. are taken by the Signal Corps and they are no inconsiderable aid to army operations. Since the modern army invents as well as fights it follows that

we have a completely equipped Research Service installed in a laboratory in Paris, where already our scientific experts under the stress of emergency have improved telephony and telegraphy. Such is the astonishing function of a little-known but all-essential branch of the Services of Supply.

Like Transportation, the Signals Corps has drawn the Stars of Communication to its ranks. In the telephone exchange at Tours one day I saw a slight grey-haired man in khaki and who wore the silver eagle of a full Colonel on his shoulders. When I met him a little later I found that he was Colonel John J. Carty, the greatest of all living telephone engineers and the man who, almost more than any other, made it possible for New York to speak to San Francisco. He is on the job in France, which means that our telephone service is as scientifically supervised as that of Chicago or St. Louis.

Thus Rails, Sails and Wires combine in the creation of an Aid to War that represents the last word in efficiency and service. The mark of America is all over it.

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## V—*Feeding the Doughboys*

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**I**N an office on the second floor of the historic barracks building at Tours which houses the Headquarters of the Services of Supply of the American Expeditionary Force sits a broad-shouldered, rangy man with keen brown eyes, firm jaw, and every external evidence of a distinct and dominating personality. From his desk which faces the crossed flags of the Quartermaster Corps that hang over the door, radiates the authority that means victory or defeat for our overseas troops. Without him there can be no flaming offensive. With him all progress is possible. He is Major General Harry L. Rogers, Quartermaster General to the whole American army and Chief Quartermaster of the Pershing host. Through him your son, brother, husband or sweetheart, whether he is in Base port or at the battle front, never misses a meal, and is always shod and clothed.

The moment you reach the Quartermaster Corps you invade the Master Domain of the Business of War. Guns can wait but hunger cannot. Upon it depends the vital energy of the combat force for the well-fed man can always fight. An army is only as efficient and as effective as its subsistence system, and it is as true to-day as it was when men hurled spears and shot arrows.

No corresponding officer in any of the Allied armies has so ramified a task as General Rogers. Stewardship of the soldier's stomach is only one of his obligations. You get some idea of the scope of his labours when I tell you that the blue-print chart of his organisation in France alone is eight feet long and has more than a hundred Sections, each one indicating a separate activity. Under his control everywhere is an army greater than the entire regular establishment of the United States when we went to war with Germany. He is the keeper of more than three square miles of warehouses in France from which flow unceasing streams of sustenance. At his direction the largest ice making plant under one roof in the world has been built. He operates farms and factories while his salvage ranges from the repair of a shoe to the restoration of a sawmill. In fuelling the fighting furnace he has expanded industry and redeemed communities at home and abroad. The figures with which he deals are so staggering that they need to be splashed on a ten-league canvas with those proverbial brushes of comet's hair.

His principality is geared up to the whole Universe of Output. The Old World and the New alike lubricate the endless chain of army supply that must never break a link. In every subsequent chapter of this book you will encounter some contact or dependence upon his far-flung functions. Chief among his responsibilities, however, is Subsistence. It is with the response that he makes to the most incessant of all demands—the human appetite—that this narrative is





**MAJOR GENERAL HARRY L. ROGERS**  
*Chief Quartermaster of the S. O. S., A. E. F.*

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mainly concerned. Again you have the revelation of a monster merchandising, driven by a titanic energy, harnessed to needs and wants that never cease. Once more you find the emergency met.

The Quartermaster Corps, which is the prototype of the Army Service Corps in the British Army, was in at the birth of the A.E.F. Like mothers' milk it begins with life for it is the means preservative of army existence. Originally the present organisation was operated by three separate bodies: the Pay Department which paid the troops; the Commissary which dealt with food; and the Quartermaster who provided clothing and tentage. Long before we went to grips with the Kaiser, however, they were unified under one head—a Quartermaster General, and in one body which was called the Quartermaster Corps. Hence the Quartermaster General of the army—the "Q.M.G."—is like the head of a corporation composed of many merged subsidiaries.

When General Pershing sailed for France in June, 1917, he took with him Colonel Daniel E. McCarthy, who was the First Chief Quartermaster of the A.E.F. With him went five assistants and also ten other Quartermaster Officers with a group of enlisted soldiers and clerks. This handful of subordinate officers and men, many of them now risen high in the Service, formed the nucleus of the tens of thousands who succour and sustain the Expedition to-day.

Like every other Service, the "Q.M.C.," as the Quartermaster Corps is termed, had humble beginning. Its first offices were two rooms, twenty by

twenty feet square, in that historic building in the Rue Constantine in Paris where our whole overseas effort first saw the light of day. The tiny quarters were flooded at the start with every conceivable kind of commercial offering that ranged from hand grenades and tennis rackets to whole bakeries and founderies. There was a constant influx of inventors, spies, salesmen, advisers, business "experts" and stranded Americans all dripping with suggestions and ideas and eager to get their fingers into Uncle Sam's purse. This itch for easy Government money, I might add, still exists. It knows neither rank nor caste.

In those early and precarious days General Pershing realised that the great bulk of his supplies would have to be brought from America. Thus our whole vast tonnage problem really began with food and it has remained the first and foremost consideration of shipping ever since.

In July, 1917, and in one of the first orders issued by the A.E.F. the duties of the Chief Quartermaster were published as: Transportation of Personnel and Supplies; Supply Transportation and Repairs; Clothing; Quartermaster Equipment; Subsistence; Fuel; Forage; Lights; Quarters; Camp Sites; Quarters and Offices; Pay of Personnel and General Disbursements; Laundries and Baths; Remounts; Claims; Salvage; Workshops and Storehouses; Cemeteries; Burials; Graves Registration; Labour and Quartermaster Personnel. With the exception of Claims and Transportation these duties remain practically the same to-day.

Part of Colonel McCarthy's force arranged for

the camp and subsistence of the first Expeditionary Force which arrived in St. Nazaire on June 26th, 1917. This force of 10,000 men brought its Quartermaster complement but it had to do some pretty lively skirmishing and lean on the French and British until the Overseas Supply Service had been established.

Meanwhile an event of far-reaching importance to our Supply Service happened. Down at San Antonio, Texas, and working as Department Quartermaster of the Southern Department was the then Colonel Harry L. Rogers, once called "The Boy Paymaster." His father conducted a famous military school in Michigan from which he had graduated and gone straight into the regular army. He had solved the biggest army supply problem since the Civil War because he successfully fed and equipped the army of 250,000 regulars and National Guardsmen that we mobilised on the Mexican border. It was Rogers who kept the supply trains and trucks filled and moving in the trail of Pershing when he went after Villa and his fellow bandits. He little dreamed as he sweated over the hard-tack and canned beans that he sent day after day out across the dusty sagebrush and the scorching mesa that he would soon be feeding that same Commander at the head of hundreds of thousands of Americans overseas. Destiny was working in his direction. On June 26th the army telegraph instrument ticked out an order to him to come to France. In two weeks he was on the ocean; on August 13th he was made Chief Quartermaster of the A.E.F.

Subsequently he became Quartermaster General to all our forces. Colonel McCarthy had to return home because of illness.

It was Brigadier General Rogers (his great work on the border had won him promotion) who faced the task of organising the Quartermaster's work in France. To write of those early times is to begin the usual catalogue of difficulties and handicaps. There was shortage of personnel, tonnage and motor transport. Besides, no one knew just how large our overseas force would be. It is interesting to reflect that at the outset our coal needs, for example, were considered at 15,000 tons a month. To-day we use nearly ten times that much.

Responsibilities literally buzzed around the head of the new Chief Quartermaster. With uncanny foresight he anticipated many emergencies. For one thing he saw that he would have to purchase as many supplies as possible abroad in order to save tonnage. Out of this vision grew the invaluable General Purchasing Board of which you will hear more in a later chapter. It was put up to the Chief Quartermaster, or the "C.Q.M.," as he is familiarly called, to locate and equip the General Headquarters of the A.E.F. and which were opened on September 1st, 1917, at Chaumont, a little town in the North that will be for ever famous. Here, and almost within stone throw from General Pershing's office, General Rogers set up shop with five assistants. From this has grown his overseas supply army which now numbers more than 3,000 officers and 85,000 men, all bound by a sense of

loyalty and service which reflect the character and purpose of the man at the head.

There is no space here to tell the story of the marvellous expansion of the Supply Service. The first Quartermaster Depot in that one-time fishing village where the American flag was planted in France was the lone outpost of the continuous bulwark of food and equipment that now stretches more than four hundred miles from the sea to the front. Whether these Depots feed five hundred men or five hundred thousand the system is just the same. Three times a day in fair weather or foul, in battle lull or amid the hail of lead, the dough-boy literally gets the dough—and a great deal more. We have capitalised every experience of the British and have added some trimmings in the bargain.

To-day the office of the Chief Quartermaster at Tours is precisely like the office of the President and General Manager of the greatest Distributing Corporation in the world. On his wall hangs that eight-foot super-blueprint which outlines the organisation. At the apex is General Rogers. Immediately under him is the Deputy Chief Quartermaster, Brigadier General J. M. Carson, who is his understudy. Linked up with the Chief Quartermaster are three assistants, Brigadier General J. F. Madden, Colonel A. K. Basquette and Lieutenant Colonel J. P. Castleman. They do just what the assistants to the head of a commercial concern do. Supporting the Deputy Chief Quartermaster is the Chief of the Inspection Division, Colonel M. J. Henry. You must understand that it is

only through constant inspection that these wheels of supply are kept moving. In this group you have what would correspond to the principal executive heads of a huge Supply Corporation.

Extending from this group are the myriad lines that link up the various Divisions. First and foremost comes Supplies, which means subsistence of all kinds—fuel, forage, clothing, vehicles, warehousing, gardens (for we raise our own vegetables) and cold storage. The other Divisions are: Salvage; Remounts; Accounting; Finance; Personnel; Administration; Construction and Repair; and, final service in the life of the soldier—Graves Registration. With the exception of this last-mentioned Section you have the complete working units of a well-knit commercial institution that deals in food, transport, garden truck, and does considerable manufacturing on the side. The Heads of these Divisions are like the directors of a corporation (they are a Supply Directorate) and sit in with the Chief Quartermaster and his Deputy at daily or called conferences which are precisely like the sessions of the Board of Directors of the United States Steel Corporation or the International Harvester Company. Every Division knows what the other is doing; each Head profits by the experience of his colleague; their united effort spells the success of the extraordinary institution which furnishes the mainstay of the American Expeditionary Force.

Now let us take a swift survey of the Lines of Supply. You can see them on the huge Map of Distribu-



tion that hangs in General Rogers' office. Red ribbons indicate the various Sections into which we divide France. Each one of these Sections, as I explained in the first chapter, is a little independent Sovereign State of Supply with a Commanding General who corresponds to a Governor. All form what I call the United States of Supply abroad. The Chief Quartermaster has a small army in each one of these States. In the Base Sections, which include one or more ports, there is a Base Quartermaster who is the Ranking Subsistence Officer charged with Supply administration. Every Supply Depot in that Section has a Depot Quartermaster who sees that supplies are received, stored in warehouses, or reloaded on cars or trucks and sent up the line to other Depots or straight to the front. There is a continuous movement of stuff. With Supplies life is one continuous round of rehandling, repacking and redistribution. It is the uncompromising price that adequate sustenance of the fighting man exacts.

If all our food and supplies could be shipped straight from the port of arrival to the consumer, which is the army, our job would be comparatively easy. We could mobilise it all in warehouses at once, two or three ports, and send it up in trains and trucks which would merely mean an automatic renewal of Base stocks. But the American Expeditionary Force is spread out over four hundred miles of communication; it must feed hundreds of thousands of men split up in units that range from five hundred to hundreds of thousands. We must keep in France a ninety

days' reserve of food for our whole overseas force and all these subsistence eggs must not be stored in one basket. In addition, the enemy infests the air, and there is always the danger of raids in some quarters. To cap all this is the incessant flood of supplies that is arriving in France at the rate of tens of thousands of tons a day. There must be no congestion at the ports. Hence there was devised a system which scatters the storage and provides for a chain of huge Supply Depots that begins at the Base and extends far up into the Advanced Section.

The Depots at the ports are called Base Supply Depots where a forty-five days' supply is kept. Half way between sea and front are the Intermediate Supply Depots which house a thirty days' supply, while those still nearer the zones of the armies are technically known as Advanced Supply Depots built to hold fifteen days' rations for the overseas forces. Each one of these institutions is a full-fledged City of Supply with acres and acres of closed and open storage; thousands of employés, with receiving, departure and classification railway yards; with water-works system, fire department, police force—indeed every detail of a self-contained orderly and thriving community. If you want one stirring evidence of American foresight and enterprise abroad just go to one of these Capitals of Subsistence and you will see sections of New York, Chicago, Detroit and "other points West" all rolled into one dynamic centre of life and action. This chain of Supply Depots is linked up with hundreds of miles of railroad over which an

almost unending procession of American Supply trains made up of American cars, hauled by American engines and operated by American crews, travel day and night.

Before we dissect the vast body through which flows the life-blood of our overseas armies we must first find out what constitutes the life-giving sustenance. In other words, what does the doughboy eat? Here we get to the one war subject of supreme and universal interest. Everybody eats; every one has some friend or relative in France; therefore he is concerned about his fare and welfare. The diet sheet of the soldier is as important as the annal of an advance and is infinitely more regular.

In the last three years I have eaten in the messes of the American, British, French, Italian, Belgian and Russian armies. Out of all this experience I am free to confess that no soldier (I cannot of course speak of the war-time German commissary) is better fed than ours. With the possible exception of the British Tommy none gets such quantity and variety. I have had griddle cakes with syrup at an enlisted men's mess at a Base port, while at officers' tables in the field I have had apple pie, white rolls, biscuits and corn bread, all piping hot, that were as palatable as any I ever had in America and all made out of the regulation ration issue. You can only realise the miracles that a good cook can work with tinned beef when you try some of the many kinds of stew that emerge from the ordinary travelling kitchen often bricked up in an open field. Uncle Sam believes with

von Moltke that "no army food is too expensive." As a matter of fact, good food is a good investment, in war as in peace.

The so-called ration is the amount of food that a soldier eats every day. In the American army the various articles such as bread, meat, salt, butter and lard that go to make up this ration are technically known as the components. This ration has been scientifically worked out by the best food experts. As far as the A.E.F. is concerned it is based on all our previous army experience in many climates and has also had the added value of the investigations of the Rockefeller Institute. Thus the food that is served every day, rain or shine, in France is ample fuel for the machine that works and fights.

As in the British army, we have different kinds of rations to meet certain needs. The standard ration, however, is the so-called Garrison Ration. The principal components are fresh beef, flour, beans, potatoes, prunes, coffee, sugar, evaporated or condensed milk, vinegar, salt, pepper, cinnamon, lard, butter, syrup, baking powder and flavouring extract. These major articles are issued in given quantities for each man. It is up to the mess sergeant and the cook to do the rest. If the mess sergeant is enterprising and the cook resourceful these articles may be converted into three very satisfactory meals, including hot cakes and syrup at breakfast, pie at dinner and ice cream at night.

These components, however, are what might be called the stand-bys. The Quartermaster provides a

host of substitutes which make for an almost infinite variety. Instead of fresh beef the men get mutton, bacon, canned meat, dried, pickled or canned fish—mainly salmon. For beans the substitutes are rice and hominy; for Irish potatoes they are sweet and canned potatoes. Frequently as a potato substitute onions or an equal quantity of canned tomatoes are served. In the same way dried or evaporated apples and peaches, jam, figs, dates and raisins are used in place of prunes, just as pickles vary with vinegar and tea with coffee.

Whenever possible fresh vegetables are a part of the soldier's daily diet. These are purchased from the French farmers in large quantities. During the past twelve months, however, the Chief Quartermaster has instituted a regular Garden service which cultivates thousands of acres of gardens which are in general charge of a Chief Garden Officer who in civil life was a one-time farm hand who rose to be Manager of a show farm up New York State. These gardens are operated by soldiers who have been temporarily or permanently disabled from fighting. They not only afford excellent employment for these men but save the army thousands of dollars. At the same time they contribute wholesomeness and change to the soldier's food. The only trouble that ever marred the fresh fruit and vegetable ration was when a negro stevedore from Georgia thought that a French melon was a faded water melon. It is tribute to the adaptability of the American soldier that these Southern

darkies have acquired an ardent if expensive taste for French melons.

The doughboy is a carnivorous animal. For him there are no meatless days. His fresh or frozen beef allowance therefore, or its equivalent in mutton, is twenty ounces a day, which is four ounces more than the allowance of the British soldier. It is the largest known army meat ration.

Every month some new feature is added to the soldier's ration. Thanks to General Rogers an ounce of bar chocolate is now a ration component. Formerly the only chocolate procurable was through purchase at the Commissary Stores. During the past fifteen years the efficacy of chocolate as a fighting man's food has been amply demonstrated. It began in the Russo-Japanese War when the little brown men scientifically showed that it is, in many respects, the most compact and sustaining of all emergency rations. As most people know, when men eat candy they have little desire for liquor. The man on the water wagon naturally takes to sweets. A candy famine in France therefore works almost as much hardship as a shortage of meat.

Another new feature is macaroni, which is not only nourishing but when mixed with cheese, which is still another new component, is most sustaining. When macaroni was first introduced the men said instinctively: "Do you think that we are a bunch of 'dagoes'?" As soon as they found out how good it was they changed their tune. Now they almost cry for it.

Still a fourth innovation in the matter of ration

issue is an allowance of four ounces of smoking tobacco with cigarette paper or an equivalent in cigarettes. This boon for the Yankee fighting man is the direct result of an order from the Commander-in-Chief, who does not himself smoke!

The Garrison Ration is increased for the troops in the front line trenches from November to March, inclusive. The meat allowance is expanded by five ounces; coffee and sugar by an ounce each. The man under fire also gets fifty per cent increase in candles and matches. The French winter with its intense cold and incessant rain makes this increase in stomach stoking necessary.

Of course bread is an ill-important item. Our men get the very best fresh white bread available. It is supplied to troops on the Lines of Communication and in the field with equal ease and quality. The field bread is in ten and twelve pound loaves and goes up to the troops in jute sacks forty-eight hours after it has left the oven. We have a string of hand-operated and mechanical bakeries that extends from the ports up to the zone of the armies and where every pound of the 1,700,000 pounds of bread that we consume every day in France is baked. One of these mechanical bakeries has a daily capacity of 800,000 pounds of bread; another turns out 400,000. The empty flour sacks are sent up to the front and used for sand bags. There is an allowance of one pound of bread a day for each man. If he gets tired of this variety he can get hard bread which we produce in immense quantities. This hard bread is a much better variety

than the famous "hard tack" which was one of the prize tooth and digestion destroyers in the world. It is excellent and when soaked in coffee is most desirable.

The components of the Garrison Ration lend themselves to much manipulation. Here is a sample average daily menu of troops on the Lines of Communication: for breakfast there was coffee or tea, fresh white bread, ham and jam; for dinner, as the midday meal is called, there was roast-beef, potatoes, canned tomatoes, fresh white bread, butter and a dessert composed of stewed apples and raisins; at supper the men had beef stew, white bread and French toast and syrup. This is typical fare and it is served with abundant variation whether the doughboy is behind the lines, in camp or barracks: travelling on a troop train, or up in the trenches. With the American army larder there is no such phrase as "no more." Every man gets as much as he wants. I have seen mess tins brought up three times in rapid succession before the ravensings of a soldier's hunger were appeased.

The so-called Field Ration is a more or less emergency or campaign ration consisting of bacon or canned meat, hard bread, beans, potatoes, dried fruit or jam, sugar, milk, salt and pepper. The Reserve Ration, which in some respects corresponds with the Iron Ration that the British Tommy carries in his haversack all the time in case of a breakdown in food transport, consists of bacon or canned meat, hard bread, coffee, sugar and salt. Our men must keep this on their persons when in the field. Still another



Reserve Ration, which is kept in poison-gas and water-proof tin containers in the trenches and which is never touched except in case of acute need, consists of canned meat, prepared chocolate and a tinned essence of coffee which can be instantly prepared and be made ready for use by the addition of hot water.

In many messes the men have special funds secured from the sale of garden truck, the disposition of kitchen refuse for salvage, of the raising of rabbits which can be done in the permanent camps. This money is used for the purchase of ice which is not a ration issue or other luxuries. One Motor Transport mess at a Base port was able to have ice cream every day as a result of a well-organised mess fund. Besides, all members of the A.E.F. can buy preserves, extra jam, candy, canned goods, cocoa and chocolate and various other articles not issued by the Quartermaster at the Sales and Commissary Stores which are found wherever our troops are stationed. These goods are sold at cost.

Such is the food supplied to the American troops. But war these days is an international affair. The mouths that we must feed not only include those of the German prisoners, who get ample for their needs, but likewise the mouths of the Congress of Nations that labour for us everywhere in France. They include Indo-Chinese coolies (the Anamites), Northern Chinese labourers, Italian militarised service troops, French, Spaniards and Greeks. For the Indo-Chinese the ration is largely rice, bread and meat garnished with garlic; for the Northern Chinese the prin-

cipal components are rice, bread and vegetables, mainly turnips; while the Italians, French, Spaniards and Greeks get bread, meat, macaroni, vegetables, coffee and a daily allowance of half a litre of red wine. This wine is as necessary a part of the daily food issue of the Latin soldier as bread or meat.

Although we are feeding more than a million and a half men in France there is no cook problem. That ancient adage, "God sends the meat but the devil sends the cook," has no echo in the A.E.F. Thousands of trained food mechanics were caught in the various drafts. You can find hash-slingers from the popular price restaurants working side by side with real chefs from the swagger restaurants and hotels. At the army oven all men are equal. They are only judged by results.

Any shortage in cooks is readily filled for, like the British, we have a School for Cooks. The men get a course of instruction in plain cookery. Then they are given practical tests. They must try their food on each other first. You may be sure that this makes for efficiency. The Government also issues a Manual for Cooks which is not only a complete and scientific cookbook with hundreds of recipes and menus but also shows with simple text and comprehensive pictures how to cut fore and hind quarters of beef and carcasses of pork and mutton with the least possible waste. There are illustrations which show cross-section of field ranges and camp ovens. In order to meet any emergency or breakdown in kitchen equipment there are specific directions how to make an im-

promptu fireless cooker by placing a milk-can in an ordinary water container with hay or straw packed between. This book is as complete as any I have seen in the war. It is fool and waste proof.

The average person is apt to assume that because the army kitchen is in the open, in temporary quarters, or on the move it is lax and unsanitary. As a matter of fact it is under rigid military discipline. For every one hundred men there is a mess sergeant who is the czar of his little domain. The cooks, dining room orderlies and the Kitchen Police—the "K.P.'s"—are under him. The "K.P.'s" who do the scullery work are recruited from the men disciplined for minor offences. In scrubbing floors and gathering garbage they have ample time to reflect on their misdeeds.

"Cleanliness," to quote the army Order invoking it, "which is still our most reliable protection against disease," is drastically enforced. The army cooks are required to keep their nails trimmed and clean. They must scrub their hands with hot water and soft soap before entering the kitchen. There is a daily issue of white caps and aprons which are worn all up the line as far as the area of fighting.

Those gallant British cooks and kitchen orderlies who dropped their frying pans and dishes and rushed to the firing line at the first battle of Ypres have nothing on their American comrades. Nearly every day you hear of some courageous Yankee who kept the pot boiling amid shot and shell. Not long ago an army cook, Harry C. Ricket, was awarded the Distinguished Service Cross. His performance was so

remarkable that I present the Commander-in-Chief's citation. When you read it you realise that there is not only honour but glory among cooks. Here it is:

"He maintained his kitchen at Château-de-la-Fôret, near Villers-sur-Fère, France, on July 28-29, 1918, during a bombardment so intense as to drive all other kitchens out of the village. When his stove had to be taken to the rear, he improvised a fire in the ground and continued his work until ordered to leave. He carried water from a spring which was repeatedly shelled when others would not approach it. Unaided, of his own volition, he conducted a first aid station for wounded and exhausted men at his kitchen. Constantly in extreme personal danger from machine gun fire from low flying airplanes and bombardment by high explosive shells, Cook Ricket devoted himself entirely to the needs of others and made possible the care of several hundred wounded, exhausted, and hungry men."

All the romance of the war is not where danger calls or the spotlight shines. Even so prosaic a task as food procurement becomes a stirring if smokeless drama of achievement. It discloses a series of remarkable performances by an equally remarkable man who will have a unique place in the record of the A.E.F. To know what he did you must first know who he is, for he is the embodiment of the real democracy that constitutes our overseas force.

Back in 1897 an immigrant boy of sixteen, Otto H. Goldstein by name, arrived in Chicago from his home in Bohemia where his father was a rabbi. When the war with Spain broke out he joined up as a pri-

vate in the Second Cavalry, served in Cuba and the Philippines and rose to be a Top Sergeant which was as high as he could go. In 1905 he quit the army, entered the grocery department of one of the great mail order houses which have helped to make Chicago famous, and developed such executive ability that he became a Manager. A few years later he went into the wholesale grocery business on his own and had built up a considerable trade when we declared war on Germany. As a sidelight on his subsequent career let me add that he mixed considerably in politics and served a term in the Illinois Legislature. He at once offered his services to his country; was made a Reserve Officer with the rank of Captain—he is now a Major—and began a whole new army career that was to be as dramatic as it was useful.

Major Goldstein is the type of person who makes things happen. He was sent as student to a Commissary School at a cantonment; in a week he was instructor. As soon as he arrived in France he was ordered to straighten out a tangle at a big Supply Depot in the Intermediate Section where there was difficulty in feeding fifteen thousand men. In a month he was supplying one hundred and fifty thousand.

His first great opportunity now developed. Coffee is among the fundamental daily ration army requirements. It became evident that we would need 6,000,000 rations, or 280,000 pounds of the roasted and ground bean every day, which exceeds the output of any private plant or group of plants in the world. General Rogers wisely decided that to save tonnage

and likewise meet any market emergency we must have our own army coffee industry. This is how Uncle Sam began his career as manufacturer for the army on a large scale abroad.

Fortunately a large stock of green coffee was available. There had been a remarkably good coffee crop in Brazil just before the European war began. German financiers started to get a corner on it. As a consequence dealers everywhere, in self-defence, bought up immense quantities. With the outbreak of war the attempted German coup failed, prices dropped, and the market was flooded. Happily an immense quantity of this coffee was in France and it fell into the hands of the Chief Quartermaster of the A.E.F.

The problem was to find a man to run our coffee business. General Rogers had known of Major Goldstein in his old regular army day. The Major had dealt in coffee as a wholesaler in Chicago, so the roasting and grinding job was put up to him. It was easier said than done. No coffee machinery was available in France so Goldstein designed roasters that were vastly more sanitary and efficient than the French machines.

He then set about to establish a factory at a little town not far from Paris and where he could have both water and railway transport. It was impossible to find a suitable structure so this indomitable one-time sergeant said: "I'll build a factory." He leased an abandoned brickyard, hired several hundred disabled French soldiers who made bricks stamped "U. S. A.," and with them constructed a model elec-

trically-driven roasting and grinding coffee plant. When I saw it one Sunday in September, 1918, it was using 90,000 pounds a day. The whole process is mechanical from the moment the green bean is emptied from the original sack until it emerges brown, fragrant and powdery into the fifty-pound receptacle in which it goes to storage or kitchen. Nearby was a warehouse that contained 11,000 tons of the green coffee.

The process of roasting, grinding and hauling which at current French rates would cost \$112 a ton is done at the army factory for exactly \$18.80. This coffee is delivered to the army kitchen at a cost to the Government of 14 cents a pound. When the present immense stock of green coffee is exhausted the new supply will come direct from Brazil to France which will save rehandling in the United States and the second tonnage across the Atlantic. In order to minimise haulage and be ready for any of the contingencies that arise in war, Major Goldstein has installed three other model roasting and grinding plants, all duplicates of the original establishment and where we will be able to prepare the entire 6,000,000 daily rations by the first of the year. At the Paris plant he has trained a corps of men to operate them.

With the addition of the ounce of chocolate as a daily ration component Major Goldstein launched his second venture. Once more General Rogers wanted to save tonnage and at the same time produce his own article and again the job was put up to the man who had revolutionised the coffee business.

In France the manufacture of chocolate was greatly curtailed during the war. This meant that acres of chocolate-making machinery—most of it controlled by a small group of manufacturers—were idle. It took tact and diplomacy, however, to rent this machinery but Goldstein acquired it.

To-day in nearly a dozen factories we are producing over 5,000,000 packages of chocolate a month. Of this 4,000,000 pounds is the ration made up in ounce bars, while the rest is bonbons which are sold at the sales stores. With candy Major Goldstein has wrought another tonnage saving revolution. Before we went into the business these chocolate candies were sold in pound circular tins that cost the men 54 cents each. They not only used up vast quantities of tin but could not be carried on the person. Major Goldstein packs the chocolates in flat cardboard half-pound packages that fit into the pocket. At the same time they save forty per cent in tin tonnage. What is equally important these packages are sold to the men at 24 cents each. We also produce in our factories in France 2,000,000 packages, or 1,000,000 pounds of stick candy and lemon drops a month. Formerly it was packed in circular tins and cost 35 cents; in the flat cardboard boxes it sells for 12 cents. Major Goldstein is not particularly popular with the American candy manufacturer but he is ace high with the soldiers over there.

By these master strokes Major Goldstein came to be regarded as a sort of Lloyd George of army production. "Let Goldstein do it," became the maxim.



General Rogers now wanted to produce hard bread. Our unexpected participation in the Paris drive last July made this field commodity necessary. Major Goldstein was given a third chance to register his resourcefulness and he did not fail.

Our hard bread output is now 18,000,000 packages, or 9,000,000 pounds a month. This so-called Iron Bread, which is made of flour and water, is probably the simplest and purest-baked product that the American soldier eats. As a trifling side performance Major Goldstein has begun the manufacture of sweet crackers—the delicious *petit beurre*—the sweet butter crackers which are so popular in France and which we now turn out at the rate of 4,000,000 four-ounce packages a month. They are sold to the soldiers at the sales-stores at 6 cents a package.

All army manufactured packages bear the insignia of the Quartermaster Corps and also the words: "Made by Q.M.C., A.E.F., U.S.A." Likewise they show this inscription: "This is United States property and cannot be sold." These two precautions are taken to protect the business man from the sale of these articles by unscrupulous soldiers and to permit the American Government to live up to its agreement with the French, which is that all these articles are to be produced and used by the army alone.

One further Goldstein achievement remains to be chronicled. When macaroni was adopted as a ration substitute and as a tonnage saver it was put up to this one-time Chicago wholesale grocer to deliver the goods, and he began to deliver them forty-eight hours

after he got the order. By a mechanical process that rivals the coffee-roasting agency for simplicity and cleanliness he is turning out a million and a half pounds of macaroni a month. He is the Macaroni Man.

Sum up the Goldstein army achievement and you find that he operates exactly seventy factories large and small that did not exist six months ago. With hard bread, macaroni, coffee, and candy he is saving the tonnage of eight large vessels a month. He has a Brigadier's sphere and authority. It is typical of the man that he should install a standardised factory control and operation very much like the system of salesmanship and store arrangement in effect in a well-known chain of retail cigar stores in the United States and which enables a man to go from a New York branch to one in San Francisco and begin selling goods without delay. In the same way Major Goldstein is training factory managers and foremen so that they can change from one American establishment to another and take hold at once.

Animating all these army factories is a spirit of loyalty and a determination to win with coffee roaster as with gun that finds expression in the astounding results that I have enumerated. They are inspired by the example of this self-made soldier—a type of the American by adoption who represents a patriotism behind the lines and elsewhere that is kin to the dash and gallantry of the fighting troops. There was scant aid or comfort for the German in the revelation of what the Goldsteins of the American army did.

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## VI—*The Cities of Supply*

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THE manufactured output, imposing as it appears, is a mere trifle in the vast sum of supplies that we need for our army in France. The great bulk of it must be brought from America. How do we keep the larder filled? The answer brings us to another and all-important link in the chain of army supply and to the door of a vital branch of the American Business of War.

To see how it is done we must go back to General Rogers' establishment at Tours. In that eight-foot blueprint chart of organisation that hangs on his wall the Division of Supplies has the place of honour in the centre. Technically known as "Estimate, Care and Distribution," it keeps its finger on the state of food supply overseas and its renewal. In charge is Colonel C. B. Crusan, whose job is to see that the Quartermaster's shelves are always stocked.

The backbone of the whole system is the Automatic Supply by which confusion, hardship and shortage of food and supplies are avoided. It means, as I explained in a previous chapter, the monthly upkeep of the ninety days of reserve stock—forty-five days at the Base Depots, thirty at the Intermediate and fifteen at the Advance—which is kept in France for all troops shipped from the United States. This

monthly replacement must of course be modified to meet expansion or emergency. The Automatic Supply also applies to forage, clothing, animal-drawn vehicles and all other supplies that come under the supervision of the Quartermaster Corps. Hence Colonel Crusan's two principal labours are: first, to find out just how many mouths—men and beast—we have to feed and what we have on hand to feed them with; second, to allot the Quartermaster's tonnage so that all needs and deficiencies will be supplied.

He is able to keep a daily check on supplies by a system of Intelligence which is so complete and comprehensive that every morning there is laid on his desk and on the desk of the Chief Quartermaster, a chart which shows the exact amount of ration components on hand in terms of days at the twenty huge main Supply Depots in France. This Daily Supply State, as it is technically called, is one of the many remarkable exhibits of centralised supply control that provide the unfailing antidote against hardship and hunger. The information is sent in by telegraph between 8 o'clock and midnight every night by Statistical Officers stationed at the Supply Depots. It arrives during the early hours, is summarised, and set down on individual cards. There is a card for each component. The master chart is made up from these cards and is ready by the time General Rogers and his assistants are at their desks in the morning. At a glance they know precisely what the food situation is.

The Daily Chart of Ration Components and Forage on Hand—the Daily Supply State—is so concrete

that a child can understand it. At one side is printed a list of thirty-one Ration Components, including fresh and tinned beef, bulk and tinned bacon, flour, dry and baked beans, rice, potatoes, prunes, coffee, sugar, milk, salt, lard and syrup. Also included are cigarettes, cigarette papers, smoking and chewing tobacco and the three principal forage items, which are hay, oats and bran.

At the top of the chart is a scale showing total days supplies up to 150. The supply on hand is indicated by a coloured horizontal bar under this scale. The Base Depots are represented by blue; the Intermediate by green; the Advance by red. If a red, blue and green bar extends from item "Dry Beans" and stops under the figure 100 it means that we have one hundred days' supply of dry beans at all three types of Supply Depots. If the bar should only be green and blue (which never happens) it would mean that we only have beans at Base and Intermediate Depots. Where we have supplies that extend in days beyond 150, such as, for example, 200, this number—200—is put in the last column. Such is the chart for "All Depots." There is also a chart for each individual Depot. If it is an Advance Depot the horizontal bar would be all red; the Intermediate Depot card would be all green; while a Base would be in blue. A Depot chart is kept for each component.

The "Number of Days Supply" as indicated on these charts is calculated by dividing the total quantity of each article by the ration allowance of that article, thus determining the number of rations. The

number of rations is then divided by the Feeding Strength in France, and the result is the day's supply for all these troops. This Feeding Strength is made up at regular intervals by the Adjutant General. It is the sum total of every mouth that we must feed overseas. It does not matter whether it is the mouth of a General or a teamster. All mouths look alike when it comes to making up this great list of human maws which must be filled three times a day.

The Daily Chart enables the Chief Quartermaster to know if he has a surplus or a shortage of a ration component. If he has a two hundred days' supply of dry beans and only sixty days' supply of salt he evens up these two items in his next tonnage allocation by ordering more salt. Now we come to another important function. As I have hitherto explained, the tonnage for France is allocated every month. There is only a certain amount of tonnage which must be used to the best possible advantage. The Chief Quartermaster is allotted his share. It is up to him in turn to allocate his allocation. Here is where the Daily Chart comes in. From it he can see just what to requisition. If he has the hypothetical two hundred days' supply of dry beans on hand it means that he has a big surplus over requirements. He can cut down his requisition for beans and build up his requisition for salt. This is a modification of the Automatic Supply. Thus, wherever you touch it tonnage allocation becomes a matter of balancing and evening up.

Once that he knows what quantities to requisition

he prepares his Priority Cable to the Acting Quartermaster General at Washington. His items come in the order of their urgency. First Urgency is always Rations; second is Forage; third is Clothing; fourth, Gasoline; fifth Equipage, which is tentage, cooking and table utensils and field kitchens; Miscellaneous, which are tools, nails and kindred articles; and finally Animal-Drawn Vehicles.

With the Quartermaster as with every other Service there are Exception Requisitions which are separate from the Automatic Supply or even the modifications of the Automatic Supply. These are the unexpected demands that are constantly cropping up. They may be for special tools, a particular kind of food for convalescents, a special brand of flour. These are requisitioned in special cables and usually marked "Expedite."

Every item needed by the Quartermaster is not specified in his monthly cable. If they were recorded his cable would be as long as a serial story because they number more than five thousand. At Washington the standard requirements for every unit of twenty-five thousand men are on file and are shipped automatically. The variations become the modifications or the exceptional requirements. It is interesting to add that there is a card in the Quartermaster's Department at Tours for every one of the five thousand items on his list showing the exact quantity we have on hand in France, when new supplies were ordered, and when they are due.

The Chief Quartermaster really runs a Department

Store, or rather a succession of monster mail and telegraphic order houses. He is the great and glorified sutler. One of his responsibilities is the maintenance at Tours of a sample room which includes a "sealed and approved" sample of the myriad items that he handles. Side by side you can see tooth paste and Service ribbons; army ranges and field filtration plants; riding crops and communion sets.

The Chief Quartermaster is the biggest shipper in the whole A.E.F. He monopolises railway transport just as he uses up considerably more than half of all the available tonnage. This means that the Chief of the Supplies Division must establish a very intimate liaison with the Transportation Department. Every day Colonel Crusan gets a detailed report by telegraph from every Supply Depot giving the number, freight, and destination of every subsistence car loaded and shipped. Here is where we establish another contact with our old friend the Railway Transport Officer.

An adequate statistical system is as necessary to the successful conduct of the Quartermaster Corps as lubricating oil is to a machine. The whole structure of ceaseless operation depends upon systematised knowledge of what is going on. New Supply Depots are being constantly set up and the army grows daily. You are therefore not surprised to find at Tours a School for Statistical Officers which is in charge of the Chief Statistician of the Quartermaster Corps, who happens to be Captain R. H. Hess. In civil life he was a professor at the University of Wisconsin.



Like so many thousands of his fellow Americans he became a Reserve or what the British call a Temporary Officer. Without the splendid service of these men, many of them already of middle age, who left school, factory, office or rostrum to don a uniform, the overseas work could not carry on.

Every now and then some emergency reveals a high-priced specialist stuck away in the ranks or a subaltern. When Major-General Harbord became Commanding General of the Services of Supply a special train was made up for his use on inspection trips. The Chief Quartermaster wanted a man with experience with men and substance to take charge and run it. When the cards of the Personnel Division were examined (there is a card for every man stating his previous experience) the former Manager of a fashionable Boston Hotel who had received \$10,000 a year for his services, who had enlisted as private and risen to be a Second Lieutenant then in charge of a bakery Company, was discovered. He was called in from his obscure post, made Manager of the "C.G.'s" special train, which is run as efficiently as the Waldorf or the Blackstone Hotels.

When you analyse the actual quantities that come under the control of the Quartermaster you stir up staggering statistics. In a war that was believed to have exhausted titanic numerals before we got in, the American figures make a whole new record. Let us now gird up our strength and take a plunge into this sea of bounding billions. It is no great secret that by the spring of 1919 if peace had not come our

army overseas would have been equal to the combined British and French forces in France. To maintain this army at full strength from July 1st, 1918, to June 30th, 1919, would have required the annexation of a world of supplies without end or precedent.

We will begin with subsistence. It would have taken approximately 500,000,000 pounds of fresh beef; 184,428,000 pounds of tinned beef; 570,000,000 pounds of potatoes; 75,000,000 pounds of coffee, which will make 300,528,000 gallons; 31,269,000 pounds of jam; 218,000,000 pounds of sugar; 888,000,000 pounds of flour; 191,000,000 pounds of bacon; and 65,500,000 pounds of evaporated milk.

With clothing the figures are no less bewildering. The army needs would have been 11,304,000 pairs of breeches; 7,524,000 wool coats; 8,181,818 caps; 18,000,000 shoes; 30,800,000 pairs of stockings; 3,280,000 pairs of rubber boots; 14,292,000 spiral puttees or exactly 52,875 miles of the yellow leg wrappers. I might add for further edification that the amount of cloth for breeches and wool coats will aggregate 31,777,110 yards.

If you want still another glimpse of super quantity I have only to add that in the matter of hay alone our beasts would have eaten 4,091,852,000 pounds. In bales double compressed and placed end to end this hay would reach one and a half times round the earth at the equator. Stacked ten feet high these bales would cover 460 acres. It is enough hay to last one horse 862,350 years.

So far we have dealt with supplies on paper. We

can now go into the mechanics of operation and follow the actual food from port to trench. We will begin at the docks where the trains, loaded direct from the ships, are rushed to the Base Supply Depots, the first stage of our journey and which are usually located from five to ten miles from the ports. Under ideal conditions these establishments must maintain forty-five days' rations for the whole overseas forces. They are all similar in scope and system. For the sake of illustration I will take one of the largest which incarnates American hustle at its height. It is at St. Sulpice near Bordeaux.

A year ago the site was a serene stretch of farm and vineyard; to-day it is a City of Warehouses that throbs with incessant movement. Here as elsewhere the warehouses are arranged in the form of a huge ladder. Three warehouses, end on end, are the rungs while the main lines of railways are on the sides. Connecting these main lines are endless spurs which enable the cars to be switched right up to the door for unloading and reloading. There are usually three Grand Groups of structures each divided into Sections which contain six warehouses. Some of these Groups comprise fifty or sixty buildings. We use a standard warehouse fifty feet wide and four hundred feet long. Some are of fabricated steel and can be erected in ten hours; others have wooden supports with corrugated iron sides and roofs. We must build and use at the same time. Often a warehouse is filled with food before it is under roof. These immense Depots literally grow over night.

The specific Depot that we are visiting would have had, when completed, nearly 3,000,000 feet of closed storage and 6,000,000 feet of open storage. Two-thirds had been installed when I saw it late last August. Ninety per cent of the space is used for Quartermaster Stores. You can wander through acres and acres of food. A single unfloored warehouse contains 12,000,000 pounds of flour. In a comparatively small group of buildings I saw 40,000,000 rations of milk; 75,000,000 rations of tobacco; 40,000,000 rations of canned pork and beans; 35,000,000 rations of sugar; 35,000,000 rations of flour; and 20,000,000 rations of coffee. This mass of merchandise, which merely represented the foot-hills of our overseas range of subsistence, was all brought from the United States, a fitting tribute to the triumph of our sea-transport over the German submarine.

The vastness of these Depots is such that an inspection on foot or even in an automobile is out of the question. They are so criss-crossed with rails that you must use a "Scooter," which is a motor-driven hand-car fitted for standard-gauge tracks. It took me nearly half an hour to travel over this plant at passenger train speed. Every important official has his own "Scooter" and you can see them scooting over the place at all hours of the day and night.

Although millions of rations pour in and pass out every day there is such a perfect system of control that every case and sack is accounted for. Even the broken packages are carefully assembled and repacked. They are eternally under a sleepless scrutiny that lets

no guilty commodity escape. The greatest possible care must be taken of all articles because they not only represent their value in money but weeks, sometimes months, of solicitude and travel.

In charge of the whole establishment is the Depot Quartermaster, Colonel Charles E. Wheatley, who knows every evening just how much food, clothing and equipment has arrived during the day; the exact quantity of supplies by items under his acres of roofs, and the precise number of loaded cars that have gone up the rail to the Intermediate and Advance Depots. At a Base Supply Depot the cars are loaded in bulk and not by individual ration components. Whole trainloads of groceries or forage pull out in rapid succession. A congestion here would be felt instantly along the whole line of food communication.

This continuous check on stocks is possible because everything is recorded on paper. The warehouse system will illustrate. Every warehouse has a Storekeeper—a sergeant—usually assisted by a clerk—a private—who keeps a Stock Book of every article that is handled. Opposite each item is the number and mark of the car in which it arrived or departed. This Stock Book is balanced every night and the result put on a Warehouse Receipt which is sent up to the Depot Quartermaster's Office where it becomes part of the general records. In addition every Warehouse keeps a Stock Card for every item it carries. It may be for tinned bacon, sugar, coffee, flour, coats, trousers or shoes. In the office of the Depot Quartermaster is a Master Card for every item of supplies

in the plant and which is the sum of these Warehouse Cards. From it the Statistical Officer takes the totals which he telegraphs to the Chief Quartermaster at Tours every night and which go to make up the Daily Chart of Ration Components that General Rogers finds on his desk every morning.

At a Base Supply Depot as many as four hundred cars come and go every twenty-four hours. How are they handled? In a tiny office in the midst of those seething acres—"our little hut on the hump," as it is called, for the gravity hump of the railway classification yard is nearby—sits the Co-ordinating Officer who runs the whole traffic show. His job is to co-ordinate orders, cars and shipments and, to quote one of them, "it is *some* co-ordinating."

It would take a book to give a complete record of what these "C.O.'s" do. Briefly the system is this: when a train arrives from a port an Assistant Co-ordinating Officer chalks on each car the number of the warehouse to which it must go. This is called "spotting" a car. If it is flour it goes to a flour warehouse; canned goods to a grocery warehouse, and so on. He has in hand a list of available structures. Every effort is bent to "spot" cars at night and at noon while the labourers are eating or sleeping so as to avoid pulling cars in or out while others are being loaded or unloaded. After the train is marked it is broken up and switched to the warehouses for unloading. This completes the work on incoming trains.

For outgoing trains the shipping order first goes to the Co-ordinating Officer who computes the number

of cars required. These cars are then "spotted" for the warehouses from which the supplies are to be secured. An "Order to load" automatically goes to the Storekeepers who not only load but attach to each car the United States Army label which gives, in English and French, the car number, mark, destination, date of shipment, weight, contents, consignor, consignee and the signature of the person who loads and seals the car. It is now up to the Railway Transport Officer to assemble these cars and send them on their way. A so-called convoy, that is an enlisted man, is sent with each train-load of supplies as guard. He is required to report its arrival at destination by wire.

The railway yards that are part of this establishment include a cold storage plant which will have a capacity of 4,000 tons of beef a day; a waterworks system; coal yard; ash dump, and completely equipped locomotive shops. Practically every scrap of material employed came across three thousand miles of submarine-infested seas. I cite these facts merely to show the immense amount of construction that attaches to the installation of these Depots alone.

Prodigies of labour are performed every day at this and other Depots and they are merely part of the routine. Upon one occasion an order came in for a hurry-up shipment of flour for the French army. It was at the close of a boiling day in August and the negro labourers—those smiling darkeys from the cotton plantations of the South—were "all in." The flour had to be loaded and shipped at once. The

Director of Labour assembled his men (it was just after supper), told them of the emergency, and called for volunteers. Every man responded. In exactly fifty-five minutes those black heroes had loaded 700,000 pounds of flour in sacks, and ten minutes later the special train was on its way. Such is the spirit of the "S.O.S."

At another Base Supply Depot—Montoir, near St. Nazaire—bigger in area and action than the one I have just described, the project called for two hundred standard warehouses or 5,000,000 square feet of covered storage and 10,000,000 square feet of closed. More than half were up and filled when I was there while new buildings were going up at the rate of one a day. Two hundred miles of railway already linked up this City of Supply, the Mayor of which was Colonel Alexander E. Williams, Depot Quartermaster, a famous football star in his day at West Point and who bucks the line of supplies with the same force and success as he did on the grid-iron.

While making a tour of inspection with him I saw German prisoners, American-captured, for the first time in this war. I asked one of them what he thought of America's war participation as shown by the vast community of supplies of which he was an unwilling member and he replied (as most of them replied wherever I found them within our lines): "We had no idea that America was doing so much. Our officers told us that there were only a few of your soldiers in France." Here is a significant revelation of German methods. The great American offensive launched



last September awakened the German private to the serious menace of the Yankee effort for the first time.

Imposing as are these Base institutions they seem small beside the mammoth Intermediate Depot that we now reach on our pilgrimage to the front. Instead of a City it is a whole self-contained State of Supply with a Governor in the shape of the Commanding Officer, Colonel C. J. Symonds. His Commonwealth is six miles square; he is head of a population of twenty thousand; the three hundred buildings that dot his domain house nearly \$100,000,000 worth of supplies. A year ago this swarming bee-hive of varied activity was a stretch of scrubby, sparsely cultivated, unimproved land. Such a place is Gievres, one of the many miracles of America in France.

Here you scale the Peak of Supply. Although the Quartermaster, as usual, monopolises the bulk of space, there are stupendous warehouses for Ordnance, Medical, Engineering and Gas and Oil Services. You see bakeries going at full tilt; coffee roasting and grinding mills that consume 70,000 pounds of the green bean a day; a complete ice and cold storage plant; tank farms and army-operated gardens that help to provide the daily fresh vegetable ration. Now you see why I call this particular Intermediate Depot self-contained and why, when it was suddenly and temporarily converted into an Advance Depot, it was able to feed and equip the whole army that General Pershing swung into action over-night in the Paris drive last July and to take care of regular business at the same time.

Once more you have the bustling spectacle of immense rehandling, storing, reloading and shipment of bulk stores—all under that same admirable control that records everything and loses nothing. The Depot Quartermaster, Colonel O. G. Collins, is the centre of what seems to be an interminable effort. Yet it is at his fingers' ends all the time. The plan of Depot Standardisation put into effect by General Rogers last September has stabilised the whole storage process.

There is only space left for me to enlarge upon two of the many features which make this Depot unique in the whole story of army supply. The first is the system of ice making and cold storage that we have set up in the midst of those one-time fields. When I tell you that this factory has a daily ice making capacity of 500 tons (it is the largest ice plant under one roof in the world) and that its five cold storage rooms hold 6,500 tons of beef, you get some idea of what one branch of the Quartermaster Corps here represents. Figuring on a basis of a pound of meat per person one storage room alone would supply the city of Chicago for a whole day, while the total capacity of the five storage rooms would provide meat for the combined populations of New York, Chicago, Philadelphia, St. Louis, Detroit, Boston and Cleveland for the same period. The cooling coils for the expansion of ammonia laid end to end would reach from New York to Philadelphia. This establishment built by the army for the army, and constructed in less than five months, employs six hundred men day and night. Every twenty-four hours one hundred and twenty cars

are handled at its platforms. From tiled floor to smoke-stack all the material used was transported from America.

The second outstanding feature is the remarkable system of Car Control. At this Depot more freight cars are handled than at any other. Seventeen engines are required for switching work alone. In August thirteen thousand cars came and went and the number increases each month. In the early days it was comparatively easy for the Depot Quartermaster to keep track of traffic. He could walk over the yards and see everything with his own eyes. When those tens of cars expanded into hundreds and the project annexed square miles this was a physical impossibility. It is vitally necessary for him to know the Car and Labour situation every hour. He faced a serious problem.

Colonel Collins met this emergency by devising what is known as the Location and Distribution Board. At first glance you think that it is one of those huge boards covered with coloured pegs that the military strategists use to block out war games. As a matter of fact it is a large board which is an exact plan in wood of the Quartermaster's Depot showing warehouses, open storage space, ice plant and the railroad spurs. The Subsistence warehouses are in red, Clothing in blue, Miscellaneous in green, Forage in yellow, and Animal Drawn Transportation in brown. In front of every miniature warehouse is a succession of holes for the insertion of pegs. These pegs represent cars and are stuck in or removed as the cars are

loaded, unloaded or sent away. A black peg represents a car to be unloaded, a white peg is an empty car; a red peg a car to be switched; a combination green and black peg is a car in process of loading; a green peg is a car ready for shipment. The Labour units whose capacity is three cars every four hours, are indicated by steel nails that fit the holes. Here are the pawns and the board for the all-important game of car location and labour distribution. How is it played?

Across from the Board sits the Traffic Officer who gets constant telephone reports of the "spotting" and location of cars and the progress of work. He communicates these facts to three men whose sole task is to keep pegs and nails properly placed. The Board is reset every hour. Colonel Collins's office adjoins the building in which it is located and he can step in every few minutes and see at a glance just what the situation is. If traffic is booming he stands by the Board all day. If the Board shows a string of black pegs with only one nail alongside it means that there is insufficient labour there. He at once looks for a predominance of labour elsewhere and orders a readjustment. Hence the Board enables work to progress with uniformity. Likewise it indicates the improper location of cars and thus prevents congestion. The whole objective in any Supply Depot is to keep cars moving. Every minute that a car stands idle its tonnage is lost to the army. Once congestion begins it is likely to become cumulative. The Board provides insurance against this contingency.

Knowing these facts you are not surprised when I say that a notable Supply achievement of the war was registered in this Depot. At 8.15 one morning last August a telegram was received ordering exactly 4,596 tons of supplies, including 1,250,000 cans of tomatoes, 1,000,000 pounds of sugar, 600,000 cans of corn beef, 750,000 pounds of tinned hash and 150,000 pounds of dry beans. At 6.15 o'clock in the evening—or just ten hours later—this colossal requisition, which required 457 cars for transport, was loaded and on its way to the Advance Depot.

Such is the scope and capacity of an American Intermediate Supply Depot. In my war wanderings, which include much investigation of Supply systems in all the Allied armies, I have yet to encounter an institution that approaches this one in magnitude and operation. A twin Depot was in course of erection at the time the armistice was signed. Uncle Sam did not do things by halves in France. More than this, every Supply establishment is capable of almost indefinite expansion.

At the Advance Supply Depot you are one step nearer the front. It only carries a fifteen days' supply and is therefore smaller than the other Depots we have visited. The bulk loading system now ends. The Depot becomes a huge Department Store that carries everything in stock from toothpicks to overcoats. All outbound trains are packed for Divisions or other units in Balanced Rations for actual consumption in training area, rest camp or trench. The full human Feeding Strength of a Division is 28,000 mouths.

The Divisional Pack Train therefore hauls every ration component from pepper to fresh beef for 28,000 men. These trains go up every day.

The Advance Depot warehouse must necessarily be a glorified grocery shop. It carries an average of 1,125,000 Balanced Rations which flow from the loading platforms on gravity rollers into the waiting cars and are checked up by French girls who relieve able-bodied men for other tasks. Every unit, whether Machine Gun Battalion or Division, has its goods marked in its name. The car, however, is consigned to the Railhead where the Railhead Officer, who has a list of all the organisations he serves, does the distributing. Despite the ceaseless ebb and flow of supplies the Depot Quartermaster at an Advance Depot keeps a daily check on stock on hand; cars received, unloaded and sent on; food, fuel, forage and clothes shipped, and the state of labour.

But units are constantly moving; disease, accidents or casualties thin ranks; replacements of men are continually coming up. How can the Depot Quartermaster adapt his daily shipments to these constant changes? Once more you touch an interlocking system of Daily Intelligence that chronicles change and swiftly adapts supplies to needs. It brings us for the first time to the threshold of one of the most useful and important individuals in the whole "S.O.S."—the Regulating Officer. In the British Army he merely regulates the Divisional Trains at the *Triage*, as the Regulating Station is called in French. With us he not only does this but is the Traffic and Supply

Boss in his part of the Advance Section and holds down a job of many-sided responsibilities.

Let us tarry for a while with the Senior Regulating Officer of the A.E.F., Colonel M. R. Hilgard, a master manipulator of transportation and a sure enough live wire. "Be Brief and Be Quick" is his motto; there are no chairs in his office which occupies part of a little frame building near a railway station somewhere in Northern France. A year ago this particular spot drowsed along with routine traffic; to-day it is a maze of rails that bustle with animation. Three thousand cars have found trackage there at one time. This Regulating Station is the neck of the whole American Supply Bottle. Choke it up and the flood of food stops and the fighting man goes hungry. The army accepts no excuses. Supplies must move. This is why you find a man of the Hilgard calibre in charge. He is at his desk from early morning until midnight and sometimes longer. When he goes to bed (he lives within a stone's throw) there is a telephone alongside. The traffic Manager of the Union Pacific system has never faced problems more vital or complicated than the anxieties that press down on him every hour of the twenty-four. He only knows one law, which is "Troops must be fed." Once when there was a congestion of traffic for a few hours he commandeered two hundred motor trucks from everywhere and everybody and kept the supplies moving.

To Colonel Hilgard—as to any other Regulating Officer—come the Daily Requisitions for food at the front. Every Division has a code name. Let us

say that it is Isabel. If Isabel is at full feeding strength the Daily Requisition for her would simply read: "Isabel 28,000." The Depot Quartermaster has the list of Divisional requirements on file and fills them automatically. If Isabel has been in action and has had casualties the Daily Wire would read: "Isabel 23,000," which means that this unit has lost 5,000 men. If Isabel has gone back to a rest camp at full strength the message would say: "Isabel has moved to Blank—No change." I have used the simplest and most elemental illustrations. Sometimes the units are indicated by numbers.

At this point you will ask: "Who makes up these Feeding Strengths?" This is an easy matter. Every Division has a Divisional Quartermaster to whom each unit in that Division (and they are sometimes scattered) reports its daily strength. These Divisional Quartermasters report to the Corps to which they are attached and the Corps in turn through its G1 or Procurement Section, reports to the G4 of the Army in the field of which it is a part. The G4, which is the Great Provider, renders the Consolidated Feeding Strength to the Regulating Officer. Hence Colonel Hilgard knows every day how many mouths must be fed. He orders the Depot Quartermaster of the Advance Depot nearest to him (in this case they happen to be located side by side) to ship. The loaded cars are turned over to the Regulating Officer who hands the Railway Transport Officer the list of units for whom they are intended. The trains are made up and sent off like clockwork to the Railheads. The



record is twenty-three trains in ten hours. In August 33,000 were handled at one station. Once started the Regulating Officer advises the Railhead Officer of their departure and gets a telegram announcing arrival.

On the wall alongside Colonel Hilgard's desk hangs a huge map of the Advance Section and the Fighting Areas. Each Division is shown by a red flag (red is the divisional colour) bearing its number. Corps Headquarters are indicated by white and blue flags; Army Headquarters by red and white flags; and General Headquarters by a red, white and blue flag. The Regulating Officer must move hospital trains as well as food trains. On the map the location of every hospital train is represented by a white flag with a red cross. The presence of hospitals is revealed by red crosses. Each day the Colonel gets a report of all available empty hospital beds in the field and in the rear—also the total of "walking" cases. The moment an offensive is started he knows just where to rush the trains of mercy and succour. The "walking" cases can be shifted to other Sections.

In addition Colonel Hilgard must know the complete State of American Supply throughout France. Every twenty-four hours he receives a report of rations, fuel and forage on hand at *all* our Depots. If there is no sugar, for example, at the Advance Depots he knows that there is lots of it at the Base or Intermediate establishments. He can have a special train made up and prevent a sweetless day at the front. No wonder he lives with his job.

When you reach the Railhead you are in the Zone of the Armies. You have gone as far as the standard gauge railroad dares to go. You are up where men wear steel helmets and are required to keep their gas masks accessible. There is the usual insurance against emergency for every Railhead carries three days' supplies in reserve and also a stock of under and outer clothing for five thousand men to renew the wear and tear of actual fighting and gas casualties. The moment a man is gassed his clothing is removed and destroyed. The underclothing is for use at the Bathing and Deverminising establishments. Just as soon as men come out of the trenches they are required to bathe. Their clothes are fumigated—the "cooties" are no respecters of persons—and their underwear sent back to a Salvage Depot.

From Railhead the supplies are shipped by motor trucks or light railways to the Refilling Point which is the last food frontier. The boom of guns is now heard and the nights are often made hideous by air raiders. More than one Refilling Point has lost its entire stock in trade by shell explosion. Work never ceases for most of the road traffic up here must be under the friendly cover of night. Although exposed to all these hazards the Refilling Point maintains an adequate system of office records and a scrutiny which includes an inspection of the fresh beef that comes in every day.

There are no frills in this much-menaced Army Retail Store. Its customers are hungry soldiers whose minds are mainly on two things: food and

fighting. They brook no delay. Every morning Non-commissioned officers arrive with Ration Returns made out by the Subsistence officers of their units and which are the orders for the next day's supplies. These supplies are loaded on light railways if the country is not too much exposed to shell-fire, or on three-ton motor trucks. Where food is furnished to men actually engaged in combat it is conveyed to them in that ancient army standby, the mule-drawn wagon. These vehicles deliver their freight to the Supply or Mess Sergeants at the "dumps" in the field, who hand them over to the cooks.

Even within sight of No Man's Land there is the inevitable precaution against hunger and hardship which marks the whole American Supply Service. It is embodied in the Reserve Ration of canned meat, hard bread, essence of coffee, sugar and chocolate, packed in gas-proof tin containers and which are kept constantly in the trenches. They are only consumed in a grave emergency such as a break-down in food supply in the rear and by order of the Commanding Officer. These containers hold twenty-five rations each and are so hermetically sealed that I have seen them floating around in water. They are the property of the trenches and must not be removed.

At the Refilling Point you encounter a striking illustration of American Supply resource. Wherever a considerable body of our troops is stationed you find a Sales and Commissary Store where the men can buy little luxuries such as candy, tooth brushes and paste, shaving sticks, cigars and razor blades at cost.

When men are in the trenches or in the lines immediately behind, they can not go to these Stores. In order to supply their wants *the Store goes to them* in the shape of a Travelling Commissary which is nothing more or less than an old-time pedlar's outfit inhabiting a five-ton motor truck. At dawn this shop on wheels stocks up its shelves and chugs down the road often under shell-fire and does business not only within sound of the guns but frequently within gunshot. It represents the final word in army convenience.

You have now followed the doughboys' food from ship to stomach. The only American soldier in France who went unfed was a dead one.

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## VII—*Detroit in France*

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**I**N former wars the Constitution followed the Flag. Now the automobile is hot on the heels of the standard-bearer and sometimes forges ahead. The stupendous proportions of the great European struggle, no matter from what angle you observe them, have been made possible by motor equipment. Without the gasoline-propelled vehicle the fighting hosts could not be adequately supplied or equipped. Likewise gains could not be swiftly consolidated; huge howitzers would be as immobile as fortress guns; quick deployment of reserves out of the question. In short, Mechanical Transport is one of the vital war agencies. With the possible exception of Subsistence nothing is more essential to the grim game.

When I approached the motor domain of our army abroad in my investigation of the Services of Supply of which it is part, I felt that here, as in no other branch, would I find the complete dramatisation of American productive and organising genius. The nation that had standardised the low-priced car and made quantity output of automobiles so automatic as to become an incidental event in the larger story of its industrial development, would surely give War its supreme lesson in Motorisation. Curiously enough I found a striking repetition of Mechanical

Transport history in the war activities of the two English-speaking nations.

When Britain leaped to arms almost overnight she had no regular army motor units of consequence. The War Office depended for the provision of motor transport in the event of the mobilisation of an Expeditionary Force on a certain number of subsidised trucks already in use in civil work and on civilian chauffeurs and drivers. Hence, when the Empire rushed to the relief of Belgium it only had this more or less makeshift equipment. It started in to buy trucks both in the United States and at home and the result was an infinite variety of types and make. Here began the outstanding evil in army motor maintenance, which was—and remains—the need of tens of thousands of different kinds of spare parts and accessories for the upkeep of this Congress of Vehicles. Standardisation, which means interchangeable parts, was out of the question.

Practically the same thing happened when America "came in." Despite three years of warning and with the exception of the experience that we gained in Mexico and during mobilisation on the border, our army was unprepared with any sort of sufficient Motor Transport. We had to comb out the available supply of trucks and cars and the result was that the Mechanical Transport equipment in France for twelve months after we entered the conflict represented almost every known available product. When I tell you that we are required to keep 57,000 different non-interchangeable spare parts in stock you get some

idea of the price we pay for unreadiness in motor equipment. More than this, we must constantly maintain 13,000 kinds of bolts, nuts and screws, which means that the shelves of our spare part store-rooms carry a total of 70,000 separate items. With the exception of the parts for the comparatively few British, French and Italian cars that we use, all this must be brought from the United States.

It simply means that with Mechanical Transport, as with practically every other Service of Supply, we had to begin at the very beginning and build from the ground up. In the face of these handicaps, and every difficulty that lack of standardisation imposes, our fighting subsistence forces, so far as the motor is concerned, have been able to carry on from the start. The same spirit of indomitable endeavour that planted bridges, reared docks and made cities of Supply grow out of the swamps, has found incarnation in the American Motor World that has arisen overseas. It not only operates and maintains over 50,000 gasoline-driven vehicles but somewhere in that war-torn land you can find a dynamic cross-section of Detroit which builds automobiles from raw material up to the finished vehicle on wheels ready for peaceful performance or combat work. The story of the Motor Transport Corps—the "M.T.C." as it is more commonly known—is one of the impressive narratives of American war participation.

Let us go back a bit. When General Pershing dashed into Mexico "to capture Villa dead or alive" the biggest problem of the moment was to supply him

because his food had to be carried across many miles of arid country. At that time the Chief Quartermaster of the Southern Department, charged with the task of feeding the Pershing Expedition, was our old friend Major General Harry L. Rogers, the present Chief Quartermaster of the American Expeditionary Force and Quartermaster General to the whole Army. He said to himself: "The only way to maintain food communications in Mexico is with motor-trucks." But where were the trucks to come from?

Like England we had talked and written a great deal about the value of the motor-truck to the army yet at that time there were less than a thousand in the whole American military establishment and like the army they were scattered throughout the United States and the Philippines. When a certain American Major General wanted a car for use on a long inspection trip in California all he could get was authority to buy a "flivver"! This happened on March 16th—less than three weeks before we entered the war.

The trouble was that the old dyed-in-the-wool regular officer confused Horse Transport with Mechanical Transport, which are totally different propositions. With the horse and wagon only a fixed amount of work can be done each day. With a mechanically driven vehicle there is no such restriction. Normally motor equipment may be operated the greater part of the twenty-four hours. It becomes merely a matter of care and upkeep.

In the vernacular of trade General Rogers—he was then only a Colonel—"sold" the idea of Mechanical



Transport to the War Department. Then, as now, he was determined that Pershing's men should not go unfed. We began to buy trucks, cars and tractors. They were shipped down to El Paso *by Express*, so urgent was the need. We had to buy anywhere and everywhere. The first trains of trucks that went out across those scorching mesas were manned by civilian chauffeurs in charge of regular officers. These officers laid the foundations of our overseas motor machine out of the experience gained in those blistering Texas days. Thus our whole Motor Transport organisation really began down on the border. No wonder that a certain well-known truck manufacturer with a sense of humour put the following dedication in a privately-printed and circulated album of photographic views showing his truck trains in use in the Mexican campaign:

"To Francisco Villa who made possible the beginning of American Motor Transport in the war with Germany."

As a result of the Mexican experience we had about 2,400 trucks on April 1st, 1917. The personnel was organised in Motor Truck Companies of 75 men each. These Companies formed the nucleus of the Mechanical Transport personnel which now numbers nearly 10,000 men in France alone and what will eventually be an army of over 50,000. The moment we hurled the gauntlet at the foot of the Kaiser we were confronted with the need of adequate mechanical transport and its twin problem of immediate procurement. We had only acquired what we urgently

needed, but thanks to Villa we had the germ of a service which now began to expand.

Among the veterans of the Mexican campaign was the then Major F. H. Pope—(he is now Colonel)—a young West Pointer, stocky of build and determined of purpose, who had studied motor transport in the French Army Supply School in 1915. He was in charge of one of the largest truck trains that chugged into Mexico with food and supplies for the Pershing Expedition. Realising the need of a trained personnel for the army, he started a School for Chauffeurs at San Antonio where he was able to turn out a truck driver in ten days in what was facetiously called a "Get-trained-quick" course. Just as Pope was one of the pioneers in Texas so was he now a path-finder in France. Around him was reared the structure of our Motor Transport Service abroad. This, however, is a later story.

The moment we went to war the Reserve Officers began to pour in. Every man who had ever sold an automobile, owned one, or wanted to own one, had an ambition to get into the Motor Transport Service. Scores of these men at once became Chauffeurs-Instructors and were shunted off to the cantonments where they started schools. The so-called Truck Master, usually a sergeant who had served in Mexico, built up the Motor organisations in these camps. Those seasoned three and five-ton trucks that had travelled axle-deep through the Mexican sands were commandeered for work at home instead of being used as the beginnings of the motor fleets in France.



COLONEL F. H. POPE



COLONEL H. A. HEGEMAN



LIEUT. COL. M. R. WAINER



COLONEL H. C. SMITHER

44

Our first Expeditionary Force sailed in June, 1917. It had to have motor transport. America was forced to duplicate England's performance and begin to buy her automobile equipment right and left and wherever she could lay hands on a truck car or tractor. Each Motor Unit started to purchase on its own. This is why every known make of any capacity is represented to-day among the 50,000 odd vehicles that we have overseas.

In the midst of that whirlwind of buying, however, we did not lose sight of the need of a standardised vehicle and there began an attempt at standardisation, now well underway, which will enable America to present to the industrial world after the war a type of truck that is bound to be a tremendous factor in peace just as it is rapidly becoming an invaluable aid to war.

By a curious coincidence General Pershing's needs were responsible for the organisation of a Motor Transport Service in the army at home and they also formed the basis of American gasoline-driven squadrons abroad. With the first troops in France came motors. A small unit known as Motor Truck Group Number 1 which included four Truck Companies and a mobile machine shop, which is a repair outfit on wheels, arrived with the first Expeditionary Force. As the weeks passed a good deal of mechanical transportation began to come in from the United States. Each ship brought so-called Casual Chauffeur Companies. A casual, whether officer or enlisted man, is an unassigned soldier. These men and machines re-

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mained without a definite head until September, 1917, when the Commander-in-Chief sent a memorandum to General Rogers, just installed as Chief Quartermaster, directing that all Motor Transport be placed under his direction. The Father of Mechanical Transport to the American Army thus became sponsor for its development in the World War and on a scale undreamed of when he first urged motorisation down at Texas.

Meanwhile Colonel F. H. Pope had arrived in France. General Rogers looked about for a temporary Head of the infant service. His choice fell on the stocky young officer who had sweated on those early truck trains under the scorching Mexican sun. Pope took hold at once, the scattered vehicles and drivers were assembled under a centralised authority; Motor Reception Parks were established at the Base ports, and "M.T." came into being as a full-fledged if struggling organisation.

The handicaps which attended the launching of every Service of Supply abroad took up their abode with Motor Transport. There was the usual shortage of equipment and trained personnel. Colonel Pope and his colleagues began to buy anything they could get in Europe and especially in England, which accounts for the fact that you often see five-ton lorries still bearing the "W.D." and the familiar white arrow that proclaim the British War Office origin, manned by doughboys and carrying American supplies. This buying in Britain did three things. It provided immediate equipment, saved tonnage, and minimised

the spare part problem. Profiting by this experience we are now using Italian cars in Italy. It pays to use the car of the country because equipment can be renewed without delay.

As soon as our motor engine was cranked up in France the difference between operation there and in Mexico—the only other place where American equipment had seen active service—became apparent. In Villa's country there was a small volume of business and a long haul with no fuel or repair stations. In France it was just the reverse. The bulk of carrying was tremendous, the distances were short, and by agreement with the British and French Motor Services our trucks and cars could obtain fuel and repairs practically every ten or twenty miles if necessary. This co-operative effort has been invaluable, especially in the pioneer days when our Service was in the building.

For a considerable period Motor Transport remained under the control of the Chief Quartermaster. It grew so fast, however, that it was made a separate Service with a Director in Charge and became part of the Service of Utilities, which was subsequently expanded into the present Services of Supply. This means that the Capital of our Motor Empire abroad is in that historic little city of Tours, the nerve centre of Supply and Transport for the whole A.E.F. In a reorganisation growing out of a swift expansion Brigadier General M. L. Walker, a far-visioned engineer of ripe army experience, became Director of what is now officially known as the Motor Transport Corps. Colonel Pope was installed as Deputy Director. From

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their offices radiates the control of the American Motor Machine across the sea.

If you have read the preceding chapters in this book you know that the management of American Business of War is precisely like that of any big Corporation that is scientifically and therefore efficiently conducted. Hence the Motor Transport Corps is thoroughly charted and diagrammed. The scope and function of every branch from the immense Reception Parks at the ports which contain thousands of vehicles, down to a lonely garage on the highway in charge of one man, are on paper. Behind the Director hangs a huge map of the roads of France showing the truck routes from sea to front in red; with Reception and Service Parks in blue; with A.E.F. gasoline stations indicated by white flags and French by yellow.

The whole "M.T.C." naturally falls into two separate sections: one which operates in the domain of the Services of Supply behind the lines; the other which is part of the Combat Armies in the field. By following the equipment from the time it arrives in France until it delivers men, food and ammunition at the firing line you can run the whole range and see precisely how the scheme operates.

Looking at the general plan of organisation in the S.O.S. first you find that the Director of the Motor Transport Corps sits as President of the concern, while the Deputy Director is Vice President and General Manager. The six principal Divisions are: Administration, which deals with office management, per-



sonnel and statistics; Procurement, which obtains equipment and supplies and deals with the tonnage problem; Maintenance, which has the colossal job of spare part renewal, repairs and salvage; Operations, which distributes all machines and has particular charge of the truck convoys; Engineering, which provides technical advice and deals with standardisation; and Plans and Projects, which anticipates future needs and adapts the present structure to whatever emergency may arise.

Each of these Divisions has its own chart of organisation which, after the free and easy manner of motor life, is called the "Keep Your Eye on the Ball Chart" because the unuttered injunction everywhere in this highly-charged branch of army work is "Step Lively." Every man in the Motor Transport Service knows just what is required of him because, from Director down to the keeper of that lonely way-side garage, he has his job concretely before him on the wall. He can never say: "I didn't know that this was part of my work." The Motor Transport Service is excuse-proof.

We cannot make our motor trip from sea to front without first knowing how our car got to France. We must begin therefore with the Source of Supply, which is, in the main, the chain of factories in the United States whose lathes and forges rattle and clang day and night to meet the incessant demands of Army Motor Transport. The Bridge of Ships across the sea has its prototype on land in the Bridge of

Trucks that must carry men and supplies across the fertile fields of France.

Washington, which is the Procurement Centre, must know just what equipment to ship abroad. France therefore periodically prepares the Master Chart of Motor Requirements. Its duplicate hangs at Tours. When you see these immense sheets—they are six feet high—you begin to realise just what it means to keep our Motor Empire going. The Truck Sheet alone calls for 119 different kinds of trucks, tenders, trailers, carts and ambulances. This immense variety naturally results from the fact that every Service in France draws its equipment from the "M.T.C." There must be special trucks and trailers for the Air Service; huge steel-wheeled carriers for Forestry Service; portable auto rock crushers; trucks for tar distributing; trailers for heating oil and water; trucks for balloon winches; trailers with portable cranes; gasolene tank trucks, kitchen trail-mobiles; machine gun cars; dental trucks which are travelling dental laboratories with every fixture of a well-equipped dentist office in New York or Philadelphia; ammunition trucks; radio trucks on which the field wireless outfits are mounted; fire apparatus trucks, because every Base and Supply Depot has its completely equipped motorised Fire Department; mobile machine shops; and photographic trailers on which the Air Service builds its itinerant studios. I could continue the list for a good while. Practically every Service in France has some special kind of motor equipment

which must be described down to the last screw in a specification which goes to Washington.

All motor equipment for France must be ordered not less than three and usually four months ahead; first because it takes time for manufacture, and second because of the delays and hazards of sea transport. This means that the Demands up to January 1st, 1919, are already long on file in the office of the Acting Quartermaster General in Washington and the orders are being filled in scores of motor plants from Detroit south.

These Motor Transport army requirements from motor cycles up to specially constructed five-ton trucks are based on army needs as shown by organisations in France, by advance notice of troop sailings, and wear and tear on equipment in use and the necessity of keeping reserve stocks. With motor equipment as with food and all other supplies, there must be a large available surplus to meet losses due to enemy action, accidents or the terrific and incessant usage. A chart, which is a marvel of detail, sets forth the precise situation in France. The equipment in use or in Reception and Reserve Parks is in black, while the needs of the A.E.F. are indicated in red. This is the so-called Status of Motor Vehicles in France.

Motor Transport gets an allotment of tonnage from the United States every month just like the Quartermaster Corps or the Air Service. If this allotment is for 100,000 tons the Procurement Division must make up its own Priority Schedule which indicates whether trucks or passenger cars have the bulk of the

space. These requirements are reduced to weight and cubic tons and then transmitted to the G1 Section of the General Staff which forwards them to Washington. In the Acting Quartermaster General's office in Washington is a Motor Transport Bureau which places contracts with the manufacturers.

As soon as a truck or car reaches a port in France it is caught up in a control which keeps a continuous check on it during the whole period of service and until it goes into the scrap-heap. Even then the material is salvaged and becomes part of the recorded structure of a new vehicle or a retrieved part. At each port that we use you find a so-called Motor Reception Park, which means precisely what the name implies. Here you find every kind of mechanical transport. Each Park has a complete organisation in charge of the Commanding Officer who has the usual Administrative and Service Divisions under him. Administration deals with office management, personnel, records, barracks for the hundreds of casualties who come in constantly from America. In the Service Branch you find inspection, park problems, supplies, convoying, maintenance and repair. In other words, each of these Parks—and the same thing obtains in all the other kinds of Parks which you will find as you go up the line—is a completely equipped self-contained Service, able to set up, repair and maintain any kind of motor transport. Here is where the value of a standardised system comes in.

Motor Transport arrives in France in two ways: One portion is shipped on its own wheels, which

means that it is lifted by cranes straight from the deck of a ship on which it travels. In this case the vehicles are camouflaged in harmony with the camouflage of the ship. Hence you frequently see at the ports a truck body that looks as if it were a wiggly germ chart, while the wheels are a sedate and sober grey. Such vehicles are of course repainted the moment they get to the Reception Park.

Trucks and cars are also shipped crated and unassembled. At some ports the assembling is done almost within a stone's throw of the docks and in the open air, by a process that reminds you of the system in a famous Detroit quantity output factory. The axles are put on a skidway and started down by gravity. In rapid succession each part is added until it rolls away on its own wheels. At one place fifty five-ton trucks were assembled in this way in nine hours.

As soon as trucks or cars are ready to be moved they are hitched together in trains and hauled out to the Reception Park which is usually nearby. The progress of a new vehicle from the time it is unloaded or set up until issued to a unit must be, to quote the official instructions: "*A continuous flow in a given direction.*" This means that the equipment never doubles on its tracks and there is no lost motion. Arriving at the Park it goes into the Repair Shop for a thorough overhauling and repainting, after which it is sent to the Issue Section of the Park where it remains until assigned. Meanwhile it is maintained in perfect condition; the motor is started up every

day; when the order comes to move it can be started off without a moment's delay.

Most of these Reception Parks, like our Supply Cities, have risen overnight. One week a stretch of flats or swamp offends the eye; the next it is covered with acres of trucks and cars whose freshly painted bodies gleam in the sunlight. Office buildings, barracks and kitchens have also sprung up like magic. It is all part of the many-sided miracle of America in France. These Parks are usually in charge of Reserve Officers who have left motor factories or salesrooms to do their bit in the army. Typical of these men is the Commanding Officer at the largest Base Park—at St. Nazaire—who is Lieut.-Col. Will H. Brown, one of the founders of a mighty automobile institution in the Middle West; who served a term as State Senator in Indiana and who dropped everything to go to France at the outbreak of war. Throughout the whole "M.T.C." you find this calibre of man who has met the emergency with the same courage and resource with which armed attack is faced at the front.

Here is a case in point: Last winter when the Second Reception Park was in process of organisation a hurry-up requisition came from our little army up in storm-ridden Northern France. It read: "Send two truck trains at once." In charge of this Park was Major C. M. Elwell, a rangy, sinewy Middle Westerner who had been a prize automobile salesman. He had the chasses but no bodies. He called his small force together and said: "The army must have those

trucks. We have no bodies. Therefore we must build them." Day and night his men, who included collegians fresh from their studies, literally worked like beavers. Fortunately there were three carpenters among them. They improvised hay-wagon bodies and in less than a week forty trucks were on the way to the front.

As soon as a vehicle arrives at the Reception Park it receives its first dose of routine. Like a convict—and no galley slave ever worked harder than our Motor Transport in France—it gets a number and henceforth it is known only by that numeral, which is the so-called "U.S. Number." This rule applies to the Commander-in-Chief's limousine with the same force as to a "flivver." The numbering system is characteristic of the Service. The first numeral always indicates the Type of Car. All our motor vehicles are classified according to type. Passenger cars, regardless of size or body, are Type 1; light delivery trucks of one-ton or less are Type 2; three and four-ton trucks are Type 4; five-ton trucks and over are Type 5; motor cycles with or without side-cars are Type 6; caterpillars which haul the heavy guns are Type 9; even the kitchen trailers have a designation which is Type 10.

The United States numbers are arranged so as to indicate the type. For example, the official registration number of a passenger car will always begin with 1; the United States number of a five-ton truck would begin with 5 and so on. Thus you find that the first registered passenger car in the A.E.F. is 11, while the

first registered five-ton truck is 51. If you should see a truck on the road bearing the United States number 5125 you will at once know that it is a five-ton truck. Blocks of registration numbers are periodically forwarded by the Director of the "M.T.C." to the Reception Park for issue to the incoming vehicles. This registration is made by a clerk who has a completely equipped office, including typewriter and card index, in the body of a five-ton truck which is located in many instances out in the open air and in the midst of the Reception Park.

Immediately after registration, all the equipment that comes with the vehicle is taken off and stored in a reservoir of accessories. This procedure is just the opposite of the British method which assigns a driver, helper and all essential tools to a truck when it is forwarded to France. These two men and the initial equipment remain with the vehicle until it is worn out or destroyed, as they are put out of commission. Our personnel on the other hand is assigned from the Pools of Casuals which are to be found at every Park.

Every truck has a Log Book which must be kept up to date by the driver. It therefore becomes the biography of this particular piece of equipment. The title of the volume is the U.S. Number. It is a complete record of all transfers, repairs, and supplies. The tabulated information in these books is of great value to the Statisticians of the Corps. In addition it is a form of publicity which prevents waste of gasoline and spare parts.

The U.S. Number is only one detail of the control



and supervision which now take firm hold of the transport. As soon as the registration number (it is first written on a red card which is tied to the steering wheel and afterwards stencilled in white paint on the sides and backs of the vehicles), a so-called Registration Card is made out in duplicate which is the beginning of the permanent history of the car. There is a coloured card for each type of vehicle. For trucks it is white; for touring-cars and ambulances, yellow; for motor-cycles, brown. These cards contain the technical record of the vehicle and together they form the up-to-the-minute Census of Motor Transport in France. They contain the U.S. Number, type, model, make, capacity in load, gas and oil tank, serial number, motor number, and kind of ignition and lighting systems. There is also a complete record of the tires including make, size in front and rear and whether pressed on or demountable. The date and place of arrival are also recorded. All this is on one half of the face of the card.

The other half is devoted to the history of the vehicle. If a truck is transferred twenty times in the course of six months the date and place of transfer and incidental remarks are chronicled. If you want to know the location and previous service of any piece of mechanical transport in the A.E.F. you can get it at a glance from the duplicate file of these Registration Cards—the Organisation File as it is termed—kept in the office of the Director General of the “M.T.C.” at Tours.

Here is the way it works: I once asked Colonel Pope

the location of what I thought was the hypothetical number of a five-ton truck. He wrote the number on a sheet of paper, sent for a messenger and asked him to get the record of that number. In less than five minutes the messenger returned with a typewritten sheet which stated that the five-ton truck bearing this actual number had arrived in France on June 1st at Blank port; that it had been assigned first to a field bakery at X—; then to the Motor Corps at the Intermediate Supply Depot; later it was reassigned to Y. Division, and at that particular moment was in service in the Toul sector with the Z. Division. Such is the check that is kept upon everything on wheels that uses a gasoline engine in France. You can trace a motor-cycle, a runabout or a kitchen trailer with the same ease and accuracy.

This is why the Director of Mechanical Transport is enabled to keep his finger constantly on the whole overseas situation. Every morning General Walker finds on his desk the typewritten Daily Schedule of Mechanical Transport which gives equipment arrival at ports the day before; the stocks at Parks; the total number of vehicles ordered for service at the front and at the rear; the state of spare parts and the state of personnel. It is just one of the many similar charts in use in the various Services of Supply that express scientific business management at its best. This is only possible because the first link in the chain of Motor Supply was forged right at the Reception Park.

By this time you realise that the Reception Park is an important institution. It not only receives, marks and concentrates equipment but by the nature of its location is the great Centre of Assignment. When a Division at the front, a Supply Depot, or a Headquarters anywhere wants a truck or a passenger car it makes a requisition on the Director at Tours. He knows from his Daily Schedule and also from a Daily Report of Unassigned Motor Vehicles at Bases and Reserve Parks just what stock he has on hand. This stock I might add is known as a Liquid Inventory. Through the Assignment Bureau he orders Reception Park to send the equipment desired. At the same time the unit to which it is assigned is informed. This enables consignor and consignee to get together and know where they are. There is a constant flow of trucks and cars from this Liquid Supply. Hence its name.

Wherever you turn in an examination of the Motor Transport Corps you find some illuminating example of co-operation that will have its large lesson after the war. At the Reception Parks, for instance, you discover the so-called Pooling System—a distinctive American contribution to war transport standardisation. It grew out of the basic law of operating efficiency in motor transport which is that a vehicle must be worked to capacity both as to time and load. Every minute that the road wheels of a truck are idle is a dead loss. Every pound under a capacity load is likewise a dead loss. Certain fundamental operating rules deduced from these axioms are the cardinal

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principles under which our whole Army Transport Service works. They are:

First: Avoid an empty haul. Return loads should be provided for and vehicles should be parked so that the least possible time will be lost going to or coming from work, and so that as small a distance as possible will be travelled with no load.

Second: Load vehicles to capacity. Do not use a five-ton vehicle to carry a two-ton load. Use a vehicle of appropriate tonnage.

Third: Do not use two vehicles to do the work that one vehicle can do within the required time limit. Work one vehicle ten hours rather than two vehicles five hours.

Fourth: Reduce to a minimum the time required in the loading and unloading operations and the extra time required for the necessary upkeep and supply operations to the vehicle.

Fifth: Keep the vehicle in constant mechanical serviceability by constant inspection and care of the mechanism.

As a result our trucks and cars are pooled wherever possible, which means that at Base Ports, Supply Depots, and with the armies in the field there is always a central reserve of equipment instantly available. It has eliminated the abuse of property, useless wear and tear, and enables all vehicles to be used to the fullest possible extent. The case of passenger cars will illustrate. With the exception of the highest ranking officers no officer has his own car. All cars are in a pool which is operated precisely like a taxi-cab service with the exception that there is no charge for riding and the chauffeurs get no tips. When a car is issued

the driver is given a blank form which must be filled out with the name of the passenger, the car, time used, and the destination. At the conclusion of the trip the officer and civilian using this car must sign this slip which testifies that the "transportation was used for official business only." This procedure makes joy riding impossible. A similar taxi-cab system for trucks is in operation at all Depots. No Branch of the Service can get a truck without giving a good reason.

One invaluable result of this co-operative system is the Army Truck Convoy which is another distinctive American feature. I can best explain it with a concrete example. When a requisition is made on a Reception Park for a Divisional truck train, which is 188 trucks, they would, in ordinary circumstances, proceed without cargo to their accredited destination which may be twenty or one hundred miles away. Every pound of load-carrying capacity is practically lost. With the Truck Convoy, however, *every train that goes up carries freight*. On land as on sea, the A.E.F. is constantly up against the tonnage problem. Supplies are piling up at the ports at the rate of tens of thousands of tons a day. Every freight car—American, French and the British wagons that we use—works to the fullest possible capacity. Every effort must be made to relieve this tonnage tension. Hence these trains of trucks that are constantly winding along the French roads have become great factors as freight carriers.

As soon as a truck train, whether five vehicles or

fifty, is requisitioned the Commanding Officer at the Reception Park which is always at a Base Port informs the Superintendent of the Army Transport Service that a convoy is available. Instantly freight is assigned to it. Meanwhile each truck is manned and equipped; the cargo is then put aboard, a so-called Pilot who knows all the truck routes is placed in command, the convoy gets a number by which it is known until it gets to its station, and the caravan moves off. Wherever possible the freight is consigned to the unit which is receiving the train. If this is impossible it goes to some intermediate point where the trucks are again loaded for a second lap of their carrying journey. No time is lost because the Pilot wires ahead and a second relay of freight, with labour necessary to load, is ready when he arrives. Every night the Convoy reports its whereabouts to Tours. This is done to permit M.T. Headquarters to divert the train if necessary. So complete is the Truck Convoy System that there is a special book prepared for its guidance. It gives maps showing routes from the sea to every point of importance that we occupy in France; it shows the location of gasolene and repair stations; it gives concrete directions how to pack vehicles so as to use every cubic inch of space. More than once I have encountered these trains winding along the high-ways bearing their burden of freight.

Although its functions are many-sided the Reception Park merely represents the first stage in the overseas career of Mechanical Transport. Equipment is not only subject to a terrific wear and tear but also

to the hazards of enemy action. It must be renewed and sometimes rebuilt. Hence the Highways of Supply and Combat are punctuated with a succession of Depots known as Service, Overhaul, and Reconstruction Park. Each has its specific work; together they keep the Motor Machine fuelled and going.

A Service Park may be installed with combat troops or behind the lines. In the field it consists of mobile workshops which are motor hospitals on wheels to which the lame, the halt and sometimes the decrepit vehicles come under their own power for repair. Often these Parks are set up in a wheat-field or alongside an orchard with little French children as interested spectators. Such stations maintain a wrecking car and crew who bring in disabled and wrecked vehicles and arrange for evacuating them to the Overhaul or Reconstruction Parks for overhaul if necessary. In the Base and Intermediate Sections these Service Parks are installed in permanent structures. Whether mobile or immobile they carry a limited stock of spare parts, tires, and in some instances maintain a limited Replacement Section of Motor Vehicles in order to substitute when necessary a serviceable motor vehicle for an unserviceable vehicle when sent in for repairs.

The Overhaul Park, which is usually housed in a permanent structure, serves two main purposes: it repairs and overhauls motor vehicles and parts that do not need rebuilding and also serves as Advance Supply Depots for supplies, material, parts and equipment. Every piece of mechanical transport used by the

American Expeditionary Force must be overhauled periodically. It is done at the Overhaul Park.

At the Reconstruction Park you find the real casualties of transport. Here is assembled the maimed and battle-scarred equipment brought down by rail for renewal or rebuilding. You see motor-cycles that are merely twisted bundles of steel; passenger cars riddled with holes; trucks that are wire-gashed and shrapnel-torn. Crimsoning these vehicles is the good red blood of the American doughboys who stuck to steering-wheel until death released their grip. All the tragedy of war is written in these mute symbols of service and sacrifice. The Reconstruction Park is a combination of what the British call a Heavy Repair Shop and a Salvage Station for vehicles and spare parts. The work done amounts to actual manufacture and it is well worth seeing.



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## VIII—*The Miracle Motor Man*

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**A**T the vast Reconstruction Park—it is not far from Nevers—that we will now visit we touch American war wonder-working at its height. It is expressed in one of the most remarkable institutions in the whole A.E.F., in reality the throbbing incarnation of the personality of an unusual man. For now we come to the stronghold of Colonel Harry A. Hegeman, Admirable Crichton of Mechanical Transport—the Miracle Motor Man of the army. The story of how he wrought the swift transformation of a thousand-acre field into a modern, well-equipped American automobile factory employing thousands of men—a vivid cross-section of Detroit—is like a tale out of some Industrial Arabian Nights Entertainment. But there is a difference; the nights that witnessed this marvellous evolution were somewhere in France. Instead of being filled with music and magic they were packed with work and worry. Nowhere in the war have I seen a group of men to surpass the heroic unit that made this performance possible. If our Service permitted the citation of organisations for merit the Distinguished Service Cross would undoubtedly hang from its standard.

The project grew out of a plan devised at Washington in June, 1917, for the establishment of a huge

motor transport repair and spare part plant in France. It demanded a highly trained personnel, an immense amount of specialised machinery and accessories, and an experienced and resourceful Commanding Officer. This rare combination was achieved because the job of mobilising men and machines was put up to the then Major, and now Colonel, Harry A. Hegeman, one of the pioneer motor enthusiasts in the army. Curiously enough he was born at Sparta, Wisconsin. If ever a man was a Spartan it is Hegeman. Big of bone, tireless of energy, a born leader of men and a glutton for work (this is why they call him "Bull" Hegeman in the army), he was the ideal choice. A Mechanical Engineer by profession, he went into the army as Volunteer Officer in the war with Spain and remained there. His service ranges from the Philippines to Mexico. He had charge of one of the first motor truck trains which carried food and supplies for the Pershing Punitive Expedition that went after Villa. He knew a good deal about motor transport; now came the opportunity to capitalise his experience, and he did it in memorable fashion.

His first step was to buy the necessary machinery. This meant a trip throughout Industrial America. In purchasing his equipment he met scores of manufacturers. They had hundreds of artisans coming under the draft. He said to them: "Save me your skilled men," and they did. The result was the Mechanical Repair Shop Unit that will be forever famous in the annals of the American Expeditionary Force. This hand-picked organisation of one hundred and eighty

officers and four thousand men who represent exactly one hundred and nineteen different trades and occupations has recorded a succession of feats without parallel in military history.

With its arrival in France difficulties at once developed. Although the organisation brought hundreds of carloads of machinery, spare parts and tools, no site had been selected for its plant. Men and material were dumped out at the little town in the North which is the Headquarters of the Intermediate Section. At once the Unit displayed its amazing adaptability to circumstances. Instead of waiting until a site was found it immediately established itself in an old French *Caserne* (a Barracks) where once Napoleon's Legions had lived. In this dingy, draughty quadrangle including the stables, a Repair Shop was set up and in which efficient work was done.

Meanwhile a factory site was located thirty miles from town. Now began the dual life of the Unit. While one section carried on at the old French Barracks the other began to convert the thousand allotted acres into a modern automobile factory. No army labour was available and these highly skilled artisans who are supposed to have a temperament as artistic, and sensitive as an opera singer, unloaded freight cars and performed the most menial toil. At the site hundreds saw considerable trench life but it consisted of digging and levelling ground for roads and cement foundation-post excavations. Frequently they worked in rivers of mud during the wet season and in fierce sun in the dry. Because Engineers were unavailable

a detachment of these motor mechanics laid five miles of railway trackage, including ballasted road-beds, switches and turn-outs. It is typical of the character of the organisation that the foreman of the Railway Construction gang was a Chicago druggist who had joined as office man!

To obtain material for concrete work and road building it was necessary to dredge sand from the bottom of an adjacent river. It was loaded on a canal boat, drawn eight miles by mule power, *unloaded by hand* and trucked to its destination. Fifty thousand tons of crushed stone and rock obtained from French quarries were handled in the same way. Keep in mind the fact that during all this construction work the temporary shops at the old French Barracks thirty miles away were turning out an enormous amount of repair and salvage work. Both projects were under Colonel Hegeman's personal supervision. Day and night he dashed from one to the other in a high-powered automobile—inspiring, organising, planning. Only a man of massive frame, iron constitution and indomitable will could have seen the job through in the face of the handicaps that beset him and his little army of willing workers.

In less than sixty days the first immense shop—a fabricated steel structure made in the United States and shipped in sections for assembling—rose out of that erstwhile wheat-field. Now began the procession of long trains of trucks packed with machine shop equipment, tools and accessories that found their proper station at last. Before a shop was complete

it was in operation because the equipment was installed on the concrete floors before the last rivet was in the roof. Approximately six hundred tons of freight were unloaded each day by hand during the period when the shops were being equipped. The amount of actual physical labour alone performed by these men is almost beyond belief.

It was midsummer when Colonel Hegeman broke out his flag at this Suburb of Detroit that had risen in France. He had five steel shops each averaging twenty-five thousand square feet and in addition a vast storehouse equipped with metal shelves which is the great American spare part depot overseas. This Park is organised precisely like any one of the great motor plants in the United States that turn out hundreds of thousands of cars a year, with the additional responsibility of feeding, supplying and housing its four thousand employés. At the apex of the pyramid or organisation is Colonel Hegeman. Under him is an Executive Officer who has charge of office records, correspondence, personnel and statistics. There is a Chief Quartermaster charged with finance, subsistence and supplies; a Master Mechanic, and a General Foreman. Under them in turn are the various technical departments, each in charge of an army captain who in civil life was a Mechanical or Electrical Engineer. These various departments include Engineering, Electrical Work, Spare Parts, Wood-working, Motor Vehicles, Tires. A separate department deals with Salvage Reports and Records. Thus the

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institution planned to repair and renew motor equipment has become a full-fledged manufacturing plant.

Months before this Reconstruction Park, as it is technically known, was a going concern Colonel Hegeman and his Unit had become the Handy Men of the whole Intermediate Section. No matter what was wanted the Hegeman outfit could provide it. This is why I called him the Admirable Crichton of Mechanical Transport. No sooner had he set up shop than he faced a shortage in raw material. A large quantity intended for him was caught up in the Service of Supply Pool and for the moment was unavailable. A little thing like this did not disturb Hegeman. He got in his car, skirmished around the country and bought up all kinds of metal junk, including abandoned trunnion bands of big guns which he converted into dies, gears and steering arms.

Once installed his factory became the repository of requests for every conceivable kind of article. Upon one occasion the Signal Corps was in urgent need of telegraph cross arms and appealed for relief. Within forty-eight hours eight thousand arms, converted out of undressed lumber, were on their way. A whole fleet of five-ton trucks was idle because certain steering arms, unobtainable in France, had not been shipped from America. In five days Colonel Hegeman's factory turned out five hundred which immediately released this number of trucks for the front. These arms had to be made with dies and hammers practically manufactured at the plant. A third demand was for certain commutators which were urgently re-

quired for ambulances. Five thousand were turned out in lots of five hundred every three days and as a result nearly a thousand ambulances were enabled to be put into service at once. Still another achievement was the design and construction of a stock-room on wheels for use in renewing motor equipment at the front. An automobile body designed of wood and metal and equipped with scores of compartments to hold spare parts and even including a tiny cubby hole of an office for the clerk in charge, was mounted on a five-ton chassis and has been of great value. The Tank Corps needed a training tank that would give the student a realistic idea of tank riding and control so the Hegeman Unit constructed one mounted on rollers that fills the bill. The Chief Quartermaster wanted the old-fashioned horse-drawn kitchens improved. Colonel Hegeman's men equipped them with truck wheels, springs and ball-bearings which enabled them to stand shock and hard service, thus making them valuable field assets. To turn from serious war needs to lighter demands let me round out this catalogue of emergencies met by saying that when no baseball shoes were available for the six first-class teams in the organisation this astounding institution made up a hundred pairs which have proved most serviceable. You are not astonished when I say that at the time I write the Reconstruction Park Nine holds the S.O.S. pennant. This Unit does all things well.

Incredible as it may seem, all this spectacular performance has been a mere side issue. The regular task of the Reorganisation Park is to renew battered

motor equipment. The smashed motor-cycles, passenger cars and trucks that come in every day emerge remade and shining. You can follow the progress of a vehicle from Casualty Section through these cheerful, humming shops until it emerges as good as new. During the week preceding my visit in August 1, 638 Salvage and Emergency jobs were received and 445 of them were completed. The list includes large and small trucks; passenger cars; motor-cycles and side-cars; bicycles and animal-drawn vehicles such as General Service wagons. To do salvage work it was necessary to cope with more than one crisis. The Unit found that it had to upholster cars. No multiple cutter to cut trimming was available so one was manufactured on the premises. The need of an adjustable binder to bind leather to celluloid was met in the same way. The place drips with self-sufficiency.

When you visit this institution you can scarcely believe—save for the presence of officers in uniform—that you are in an establishment built by the army and for the army. Those acres of steel shops with their high roofs, glass sides and concrete floors that represent the very last word in industrial construction and which resound with the incessant rattle of lathe and hammer might be anywhere in America. Like the great Cities of Supply that we have reared it lends itself to indefinite expansion. This is why every time you come back you see some new annex that has risen during your absence. If you want the full dramatisation of American mechanical resource, ingenuity and enterprise abroad you will find it at



this Reconstruction Park which, when all is said and done, is merely one more expression of Yankee determination to do its full part in the war.

If overhaul and even complete reconstruction of wheels and bodies represented the whole Mechanical Transport upkeep proposition it would be an easy matter to keep the Service going. But every day thousands of spare parts from screw to transmission-shaft must be replaced. With standardised vehicles that have interchangeable parts we would simply have to carry a large stock of a comparatively few items. Such, unfortunately, is not the case. As I have already pointed out, unpreparedness for war made it necessary for us to buy transport indiscriminately. We use many makes and many types of every make. Their parts are not interchangeable and we are therefore compelled to keep approximately 70,000 different items on the shelves of our stock-rooms and more especially in that great Central Supply Depot which is a part of Colonel Hegeman's establishment up in the Intermediate Section. How do we do it?

To get the answer we must fall back on that army mainstay—The Automatic Supply. By this I mean that all spare parts, whether changeable or interchangeable, are renewed each month on an automatic basis. When a truck is sent to France a quantity of extra spares is shipped at the same time. If the shipment is a hundred trucks then one hundred sets of spares are started coincidentally on the same boat or some other vessel. It is precisely like the automatic supply of rations which is sent to France with every

unit of 25,000 men. This lot of spares is renewed automatically at regular intervals. In case of exceptional needs due, for example, to the destruction of a warehouse of supplies by fire a requisition is made by cable for a complete new stock. Washington has a complete file of the specific needs of every type of vehicle used. In addition it has the book catalogue of spares of every known truck and vehicle in the A.E.F. If a cablegram is sent asking for "Ten X32362A" it means that ten steering knuckles completely assembled (right front) of a certain five-ton truck are desired. Thus renewal of spare parts stock, while involving countless items, is reduced to a comprehensive and workable basis.

Taking Colonel Hegeman's Central Depot as an illustration, we find that although millions of articles are carried in stock there is a separate metal bin for every item. This bin is carefully labelled and is inspected every day. When a Service Park, which carries a small stock of spares, makes a requisition on the Central Depot for renewal of stock the Central Depot in turn automatically replaces the supply by requisitioning on the Reception Park at the Base Port. In this way insurance is taken out against sudden shortages.

When you go into the matter of spare parts supply you find that in every army certain history repeats itself. This is due to the fact that human nature remains the same whether the person wears a British, a French, an Italian or an American uniform. Most chauffeurs have a tendency to hoard spare parts.

They know that, as compared with other motor car supplies such as tires, spare parts are scarce. With commendable zeal all desire to keep their equipment going constantly. Hence they resort to all sorts of subterfuges to get a surplus of spares. In order to prevent hoarding and to have the least possible drain on the supply, no spare part is renewed until the old part is tendered in exchange. If the part is destroyed and therefore cannot be returned, a complete report on the manner of destruction endorsed by an officer must be submitted. All requisitions for spare parts must be made out in triplicate. To prevent mistakes these requisitions must be visé by an officer at the garage wherever the truck or car happens to be stationed, and who is supplied with complete Vocabularies of all spare parts. He orders by numbers and thus the Requisition is made as mistake-proof as possible.

With tires the procedure is of course much simpler. A tire is a tire. It is pneumatic or solid. No elaborate stock of different types is required. Our supply in France is based on carefully figured out estimates of tire life. Into this computation go such factors as mileage covered, wear and tear, and the kind of service the vehicle is in—that is, whether it is passenger or freight. From these facts, based on previous experience, is derived an average of the number of new tires needed by a truck, for example, every month. This average happens to be two tires. This number is multiplied by the number of trucks in France and the result represents the monthly tire renewal sent

every thirty days. The tires are usually arranged in long racks that reach to the ceiling of the darkened warehouses. As little light as possible is allowed to shine on these treasure-troves of rubber which represent a money value equal to a King's ransom.

One all-important essential to motor transport operation remains to be described. I mean gasoline which the British call petrol and the French designate as essence. To keep the army supplied with "gas" is a tremendous responsibility because without this life-giving fluid all equipment would be useless. When you analyse our system you find that it differs in every detail but one from the British. The one common feature in both armies is that the "juice" arrives in France on tank steamers. The British then reduce it to tin containers of four gallons each which are in universal use. Every British army motor vehicle carries a number of these cans.

With the A.E.F., however, the bulk system is used, from refinery to front, which means that just as we have reproduced a section of Detroit in automobile reconstruction so do we operate what amounts to a replica of the Standard Oil Company with fuel. Here the experience of the Reserve Officer again comes into useful play because the head of the Gasoline Department—it is under the control of the Chief Quartermaster—is Lieutenant Colonel Charles E. Dudley, who literally grew up with the world's greatest oil corporation and represented it in England before we went to war.

At La Pallice is our Port of Gasoline Entry. Here

come the tank steamers which carry from 1,500,000 gallons up to 3,000,000 gallons. Their cargo is pumped direct into huge steel storage tanks fabricated in America and set up by army men in France. Evidence of our war endeavour is the fact that we are now building one tank which alone will hold 2,700,000 gallons. From these tanks the gasolene is pumped in turn to American-made and American-operated tank cars—the same kind of big steel drums that you see everywhere on our railroads at home. These cars have a capacity of 6,500 gallons. Every day a string of these cars leaves the ports for the Tank Stations which you find all the way up the line from the sea to within sound of the guns.

At scores of points we have portable metal tanks for storage. They are made of assembled plates forged in America and hold from 7,500 to 15,000 gallons each. They had to be specially built to make the low clearance of the French tunnels. These portable tanks are side-tracked at the railway stations and serve as the reservoirs of supplies for the motor tank wagons that haul the fuel to the consumer which may be a garage or the headquarters of the Division in the field. These tank wagons, which hold as much as 1,000 gallons each, travel in trains. This bulk system idea is maintained straight through the Advance Section. In regions where there is danger from shell fire or air-raids a reserve supply is maintained in an underground tank which holds on an average 1,200 gallons. The gasolene flows in by gravity from the tank wagon. Up in the field a small tank mounted on a light truck

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is used to supply trucks and cars that work with the Combat Army. Only in the rarest instances is a tin can used.

The system of distribution is so simple and comprehensive that Major Dudley can sit at his desk at Tours and know all the time just what the situation is. Before him is a huge map on which storage stations are indicated by red flags. Attached to the map is a card brought up to date every morning and which shows the quantity of gasoline in France. The whereabouts of tank cars is followed with equal precision by means of a chart showing the railway routes from ports to the Advance Section. On it the location of every tank car is shown by tags. A small green tag indicates the loaded car while a red one is the empty car on its way back to the seaboard.

You might know that any American oil enterprise would have the inevitable pipe-line attachment. The army is building a line from Havre to the centre of our gasoline distribution that will save exactly \$10,000 a day in tanker tonnage alone for the reason that it will cut down the fuel ship "Turn around" by six days. Here you have another conspicuous example of American enterprise overseas. When Colonel Dudley suggested this pipe-line to the French authorities they said it was impossible.

"But all things are possible with the American Army," was the reply, and the army is making good. This undertaking means the laying down of eighty-two miles of pipe which must cross one of the largest rivers in France. The material is not only in process

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of construction but some of it, together with the skilled labour that will assemble it, is already in France.

When you come to gasoline statistics you plunge once more into the arena of bewildering figures. The average allotment is the five gallons a month for each man in the A.E.F. It is estimated that the American army in France, as now planned, will consume 150,000,000 gallons of motor gasoline from July 1st, 1918, to June 30, 1919. The Air Service alone will burn up 30,000,000 gallons in that time. Kerosene oil will be used to the extent of 7,500,000 gallons. The homely but effective item of castor oil for aeroplanes will register 2,250,000 gallons while the total amount of motor-lubricating oils for trucks, automobiles, motorcycles, tanks and aeroplanes will be 1,875,000 gallons. A final reminder of the scope of the army motor operation is the fact that during these twelve months 3,000,000 gallons of cup grease will be needed.

All motor supplies, whether spares, tires or gasoline, are easily available throughout the Sections that we use in France. I made a considerable trip by motor over the Lines of Communication and we were never at a loss for anything. The chauffeur or driver must sign a duplicate receipt for everything he gets. A carbon copy goes to his unit and is charged up against his car. Following the British precedent every road is marked in signs that proclaim: "Keep to the Right" or "Motor Transport Park Straight Ahead."

This far-flung motor-driven machine that I have

tried to take apart and which often carries the men and munitions upon which the fate of battle hangs, must be kept fit. The periodical overhaul at a Park will not do the job completely for the simple reason that day and night—for Mechanical Transport is always at work—collisions, abuses, or any one of the many hazards of travel on congested roads may impair mechanism and the car or truck might fail in a vital emergency. Hence a constant inspection of equipment is necessary.

In command of this Supervision which really supervises is Colonel Charles Hine, former Organisation Expert of the Harriman Railway System. He is a West Pointer who became a freight brakeman after his graduation and worked his way up to a Vice-Presidency. When we came to grips with Germany he was Assistant to the President of the Baltimore and Ohio Railway. Our army Motor Inspection has the advantage of his many years of experience with steam, electric and gasoline driven traffic.

At best, any kind of inspection is a thankless task. The average man who runs a truck for a corporation does not like to have an eagle-eyed and heartless official descend upon him at unexpected moments and turn his vehicle inside out. He resents the process. The whole idea behind Colonel Hine's scheme of operation therefore is to reverse the usual procedure and *make inspection welcome*. Thus tact is the first essential among his inspectors, who are all technical men and who can take an automobile apart and assemble it with equal ease. Although they have the authority



to stop any vehicle on the road and inspect it at will they carry a line of "selling talk" that will convince the chauffeur that inspection, however inconvenient, not only makes for personal efficiency and therefore promotion but is just one more step towards winning the war. The American soldier, intense individualist that he is, has taken naturally to this supervision which is such an all-essential feature of M.T. operation.

You have seen how we get machines and supplies to France and keep them renewed. These transport fleets need thousands of chauffeurs and mechanics. Where do they come from?

Here you touch the human element no less interesting in the realm of motor cars than in the domain of big guns. Go to any big army garage and you are likely to see a one-time automobile salesman giving commands to his former boss. The little tin insignia on the shoulder levels all previous relations. Up the line you may encounter John Jones, previously a driver of a Fifth Avenue motor-bus in New York, running the star-bedecked car of a Major General while the rider of the motorcycle with side-car attached that passes him on the road and throws a cloud of dust in his face is probably Bill Brown who once operated the luxurious limousine of a millionaire steel magnate. So it goes in this reeking, snorting Empire of the Automobile.

There are two principal sources of personnel supply. One is the chauffeur of civil life, who simply changes from the Vehicle of Peace to the Wagon of

War and who needs no technical teaching. The other is the man trained by the army for army Motor Service.

Let us first take the case of the enlisted man who is assigned to the Motor Transport Corps. Immediately upon his arrival in France he is required to fill out what is known as an Organisation Card on which he not only states his personal history but indicates what experience he has had with motor vehicles. On the back of this Card are the names of thirty occupations all connected with Motor Transport and ranging from assembler in an automobile factory up to expert driver and skilled mechanic. Each occupation is numbered. At the top of the Card is a scale of these numbers. If a man is a truck driver a little red clip is put over number 11—which happens to be the number of that job. On every other truck driver's card a similar marker is placed at 11. When a requisition comes in from a Division or a Park for truck drivers the Personnel Officer simply looks at his File of Men Available and can see from the number of red markers how many drivers are in his Human Pool. As soon as a man is assigned his Card goes into the Assigned Index. He is then caught up in the records of whatever unit he joins and thus continues to be a cog in the Service Census. As in the British Army Service Corps, we make every effort to employ men as drivers and mechanics who are unfit for further fighting. Class B and C men, for example, who have been wounded but who are still fairly physically fit, are trained for the Motor Service.

This brings us to the second source of Personnel Supply, which is the Army Motor Training School. Uncle Sam has set up in France as complete a School for Chauffeurs as you can find anywhere. It is running Colonel Pope's famous "Get-Trained-Quick" course down on the Mexican border a close second because it turns out drivers ready to take the wheel in exactly two weeks' time. The School is located in the Intermediate Section a short distance from Colonel Hegeman's Reconstruction Park. The reason for this proximity is obvious. One object of the institution is to give the students an intimate knowledge of automobile manufacture. Hence each day a batch of them drives over in a truck to the shops at the Park, dons overalls and takes up station at lathe or forge. They study with the real thing.

The course for drivers includes shop and field work, individual driving and infantry drill which is the training in military etiquette and discipline. No student is permitted to get a certificate from the School of Instruction until he has had a working try-out on the road. He must prove that he can run a truck on a crowded highway on a dark night and not lose his nerve. He must also assemble engines that have been taken apart and make emergency repairs of mechanism purposely put out of gear.

One necessary detail is a mastery of French road signs. As in the case of the American locomotive engineers our Motor Transport drivers are up against the language and traffic customs of a strange country. In England road traffic turns to the left instead of to

the right as in the United States. In France this is not true but the highways are literally plastered with warnings which must be heeded to escape accident. John Jones therefore must learn that "Virage" means a sharp turn, that "Cassis" is a bad bump; that "Ralentir" means "Slow Up"; that "Tenez Votre Droit" is "Keep to Your Right," and that "Passage à Niveau" is "Railway Crossing."

The school course for motor mechanics is for six weeks and includes shop work of all kinds. Before a man graduates he must give practical demonstrations of mounting and dismounting vehicles, use of machine and bench tools for forging, soldering and brazing and he must also repair solid and pneumatic tires. Most of these students have worked in some kind of machine shop before. There is also a six weeks' course for officers which embraces automobile engineering, shop management, map-reading and convoy running.

It only remains to follow Mechanical Transport up to the firing line. The moment you get into the Zone of the Armies you leave the jurisdiction of the Director of the Motor Transport Corps and come under the authority of the Fighting Chiefs. As in everything else, the Combat troops have first call on motor equipment. Each army exercises a supervision of Motor Operation. This means that there is a so-called Motor Transport Officer at Headquarters with each Corps and with every Division. These Officers are responsible for the upkeep of transport which, in the field, ranges from the motorcycle up to the huge

and unwieldy gasoline-driven caterpillars that haul the massive howitzers. Every Division has its allotment of vehicles and personnel which are renewed from Service Parks in the Advance Section.

Just as soon as a truck is assigned to a Division it is labelled with the device of that Unit which is a symbolic picture of some kind. I used to think that the French *camions*—as their trucks are known—held the record for originality of insignia with their crowing cocks and running hares but the Americans have surpassed them. On our trucks you can see baseball players at the bat; heads of pretty girls; a coiled snake ready to spring which recalls that famous Revolutionary battle-flag flung to the breeze on many a hard-fought field and which bore the words: "Don't tread on me." On our trucks you also see stencils of the Bunker Hill monument, foxes and Indian heads. All equipment of the Air Service bears the familiar red, white and blue circle which gleams from the aeroplane wings. This matter of markings for trucks is systematised. At Motor Transport Headquarters at Tours a soldier who was an artist in civil life has prepared a hundred different designs which are kept in a folder and allotted to Divisions.

In the field the Pooling System is in full swing. There is always a liquid reservoir of transport ready for emergencies. It made possible the mobilisation of General Pershing's army last September and enabled him to forestall the Germans and achieved the now historic victory of St. Mihiel. It is this kind of co-operative effort that makes for success in a war where

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Unity of Supply is just as essential as Unity of High Command.

The whole close-knit American motor machine not only serves the Fighting Army but is impressing lessons of efficiency and organisation that will reach far beyond the flaming battle-lines and have a definite and constructive effect upon the commerce of peace. Chief among them is the Standardisation of Vehicles. After a year of wrestling with every conceivable make and model we have settled down to a definite and orderly basis of supply. In passenger cars we are only buying three well-known makes whose worth has been amply proved. Likewise only two long-established light delivery trucks will be acquired while the one-ton truck to be bought henceforth will have the same chassis as our heavy ambulance and therefore the parts of these two vehicles will be interchangeable. With one and a half and two-ton trucks one make will be used which will greatly simplify renewal.

It is with three and five-ton trucks, however, that the real achievement in standardisation has been registered. It finds expression in the Liberty Truck which will go down into history as a worthy work-fellow of the Liberty Motor that is carrying death and destruction to German trench and town. It is composed of parts made by manufacturers who are provided with Government specifications produced by the Bureau of Standards at Washington. Anybody with a factory anywhere can get these specifications and make the parts. The Truck therefore becomes a matter of assembling. If you can standardise hon-

esty in the production of parts you can get a hundred per cent vehicle and, what is equally important, you will solve the whole trying problem of spare parts supply. Every part will be interchangeable. The Army is not concerned with the various arguments for or against this kind of standardisation after the war. It wants action and the Liberty Truck, like all the rest of the Mechanical Transport, delivers the goods.

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## IX—*The Salvage of Battle*

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**W**HEN civilisation begins to adjust itself to the unfamiliar sensation of a world at peace it will be found among other unexpected things that War is not all Waste. The enforced lessons of thrift, household economy and popular investment will be fully matched by the extraordinary precedent established in the conservation of men and material that can only have a beneficent and constructive effect on all future endeavour.

In my book "The Business of War" I explained the immense reclamation work of the British Army which in three years has saved to the Empire more than half a billion dollars out of stuff that would ordinarily have gone into the scrap-heap. Since that first revelation of the wonders of war rehabilitation a whole new attitude has developed toward what might be called Battle Utility.

Despite this astonishing exhibit of rehabilitation wrought out of monster destruction there was a general, and not altogether unnatural feeling when America entered the conflict that, being supplied with almost unlimited men and money, her waste would be prodigal. The exact reverse has been true. Just as we fooled the Kaiser and his fellow prophets who declared that we would be a negligible factor in the



struggle so have we confuted the alarmists who maintained that Uncle Sam would be a spendthrift. Profiting by British and French experience we have injected into the spirit of Combat and Supply a kindred spirit of saving that has almost become a gospel. Our Salvage Squads march with the advancing troops. We destroy and rebuild at the same time. The battlefield of to-day is the workshop of to-morrow. We not only do the ordinary reconstruction of equipment but we reclaim maimed human beings as well and go one step further. The soldiers who are temperamentally and otherwise unfit to fight and who would be encumbrances instead of aids, are tactfully deployed into proper and useful stations where their patriotism and their experience are alike capitalised. The Salvage of War, American Stamp, like the Business of War, American Brand, is a many-sided demonstration of Yankee originality and application.

The story of our salvage therefore falls into two General Divisions: one which deals with the ordinary retrieving of material things, and which has become a common annex of every highly organised army; the other which affects men alone and which, so far as the American Expeditionary Force is concerned, is one of the most striking and original institutions that I have encountered in the war. We will briefly go into the material work first. All equipment Salvage systems operate alike and it merely becomes a matter of pointing out result and picturesque detail.

We were fortunate in being able to benefit by the British and French systems which, with the generos-

ity that has marked the attitude of our Allies, were placed at our disposal. Since the former is fairly familiar to most Americans I will use it for comparison. At the outset you find that while the method of work is practically the same the motive behind British and American reclamation is not quite identical. The first consideration in British salvage is to save money; with the United States the foremost consideration is to save tonnage. The financial end is useful but incidental. A cubic ton of our ship space represents more than so much ordinary cargo-carrying capacity in times of peace. With us, as I have elsewhere pointed out, Ships are Life. We are up against the biggest transport problem in all military history. Wherever you turn in an examination of the A.E.F. you find that tonnage is the supreme question. Hence our Salvage grew out of the realisation of the Chief Quartermaster that it would relieve the strain on shipping if it were not necessary to give a soldier a brand new blouse every time the one on his back became unserviceable. So, too, with shoes, belts, haversacks, rifles and other equipment. The Salvage Service has reached the point where the tonnage which would have been required for the renewal of all this equipment is employed for commodities such as foodstuffs and ammunition and which cannot be retrieved in large quantities.

What is technically known as the Salvage Service was installed as a part of the work of the Quartermaster Corps. In charge is Colonel T. B. Hacker, a veteran regular army Quartermaster who took as

naturally to the job as if he had been born in a junk shop and had dealt with old clothes instead of hard tack and canned beans all his life. His office is in the same building at Tours which houses the Chief Quartermaster, Major-General Harry L. Rogers. Before him is the great map of the Domain of Reclamation, which is the usual concrete visualisation of American army work. The Salvage Depots are indicated by red and white flags; the location of Salvage Squads by red flags; permanent Army Laundries by black flags; Portable Laundries by blue; Portable Deverminising plants by green; Field Bathing and Sterilising establishments by yellow, and Fat Reduction plants by black and white. From this list of stations you get an idea of the whole comprehensive sweep of Salvage which not only cleans clothes but likewise the bodies of the fighting men.

At the start Colonel Hacker not only had the great advantage of being able to adapt the British system but he was not forced to labour under the handicaps which made it impossible for Britain to even think of salvage until nearly a year of war had passed. The British had to rush an army into the field almost overnight. They were up against a life and death emergency and emergency knows no thrift. Besides, just as soon as the army caught its breath it regarded waste of food and equipment as part of the soldier's life. There was always the comfortable reflection that "The Government is rich and can afford it." The Tommy had to be taught to save.

Strange as it may seem, the American soldier, al-

though part of a nation of wasters, adapted himself at once to the Salvage idea. He was quick to conserve everything from a horseshoe nail up to a big gun. This adaptability has been of immense help to the Service.

A third aid was the obvious fact that we began to salvage at the top wave of reclamation development which finds expression in the British army in the saving of everything in a pig except that well-known squeal, and with the French in the use of the threads dropped out of the salvage machines for the manufacture of clothing. We knew that in the army rags are shredded; that the tops of old socks are made into mittens; that scraps of leather make serviceable shoe-laces; and that even the fat is boiled out of the cloths used to wrap up carcasses of beef while the goods itself is cut up for wash-rags. The sum of these trifles, to paraphrase Michael Angelo, is the perfection of salvage.

Just as soon as we had the first semblance of an army in France we began to impress the salvage idea. Material piled up but we lacked the machinery with which to redeem it. The first problem was to find a suitable initial plant, which was easier said than done. The Chief Quartermaster assigned Brigadier General John F. Madden and Colonel M. J. Henry to this task and they scoured middle and southern France. After weeks of effort they located an ideal structure, or rather a series of structures, in a suburb of Tours. It was a group of railroad shops which the French had used temporarily as a Supply Depot.

Here we have set up Salvage Depot Number One which is the largest single institution of the kind that I have seen. Once more you get the kindling example of amazing army expansion. In January of last year it had a personnel of exactly ten, including officers and enlisted men. Only one corner of a building was used. When I visited it last August it was occupying 243,500 square feet of space and employing 7,000 persons, ninety-five per cent of whom were women who have to be hauled back and forth every day in motor-trucks. During February the value of the articles retrieved was less than \$5,000. For August they represented a saving to the United States of \$3,246,588 which was an increase of \$1,000,000 over the July record. Such is the marvel of our salvage development that naturally fits into the larger miracle of what America is doing in France.

This colossal establishment reeks with a movement that is only surpassed by the odour exuded from the tons of waste that are dumped daily at its doors. The eight acres of working space in and out-doors literally buzz. The clatter of machines cannot drown the incessant chatter of the voluble French women who range from short-skirted maids to wizened great-grandmothers and who maintain every tradition of a full-fledged factory including a strike and a "walk-out" on occasion.

Ten thousand army blankets go through the mill here every day; it is no unusual performance to repair and ship 14,000 pairs of socks between morning and evening or renew 1,000 pairs of rubber boots within

the same time. Nothing is thrown away. The garments incapable of restoration for the American troops are dyed green for our prisoners of war.

The reclamation of shoes—we turn out 3,500 pairs of shoes each day at this plant alone—is typical of the methods. The shoes are washed in big steam roller rubs and afterwards soaked in oil vats. Mechanical processes attach soles and heels. As in the British Shops the unfit uppers are cut up into laces. No less labour-saving is the system of restoring rubber boots which are dried by continuous blasts of hot air after washing. All the torn parts are repaired by expert tire men.

No detail of this Salvage plant is more picturesque than the Laundry which is the largest in Europe. It is big enough to do all the so-called "rough-dry" laundry work of a city of the size of Dayton, Ohio, and is as noisy as a foundry. Its steam-driven batteries of washing machines and wringers—each one with a capacity of 450 pieces—turn out 100,000 articles from socks to overcoats. Every day in one month they laundered 2,500,000 pieces. I can give you no better idea of the immense value of these machines than to say that each one of them does the work of seventy-five women.

This mammoth army laundry is not without its element of human interest. One day last August a new batch of men was assigned to work in it. The officer in charge lined them up and said:

"If any one here has had any laundry experience let him hold up his hand."

After a silence a little yellow private raised his right hand and timidly stepped out of the ranks.

"Where did you work?" asked the officer.

"I had a laundry in San Francisco," was the reply.

It then developed that *he was a Chinaman* who had been caught in the first draft and who is now one of the mainstays of the laundry. Re-classification will never disturb this yellow brother who is supremely happy on his own working heath.

Salvage Depot Number One, immense as it is, is merely one link in the chain of establishments. In the southern part of France we have a group of four Depots which use more than 275,000 square feet of space and employ 4,000 people. These stations specialise in shoes and are working toward a daily output of 10,000 pairs. A Harness Repair Shop which includes the repair of canvas and web equipment is a feature. All together we have nearly twenty Salvage Depots large and small with nearly a million square feet of working space, and the number will be increased as the army expands and as the visible supply of material grows.

These Salvage Depots are joined by a System of Communications which collects and distributes the material. This brings us to the really dramatic phase of salvage which is the wreckage of the Combat area. With the A.E.F. as with the other armies, there are two kinds of salvage—Battle and Normal. The former deals with the débris of actual fighting which may include anything from a haversack to a howitzer, while the latter is the refuse of the Services of Supply

which means empty packing cases, tin cans, kegs and barrels. In both areas kitchen refuse is conserved and employed in many useful and profitable ways as you will see later on.

The assembling of Normal Salvage is a simple matter of gathering up the cast-off waste at Supply Depots, workshops, training camps, barracks and billeting areas. It is with Battle Salvage that you get both the tragedy and trouble. Each army in the field has a so-called Chief of Salvage Service who is charged with the duty of supervising the collection of all material to be salvaged. Under him are Salvage Companies who are attached to every Division. These are divided in turn into Squads who follow hot on the heels of the fighting men. More than once they have thrown aside bags or shovels or leaped from collection carts and joined in the fighting fray.

Field Salvage is assembled in Advance Dumps which are precisely what the word implies. Here everything is first piled up without regard to class. You can see acres of coats, blankets, leggings, shoes, some of them marked with the crimson stain which means that death has been near at hand. Still more impressive are the great Metal Dumps which are immense stretches of junk and which give the impression that Uncle Sam has gone into the second-hand business. Steel helmets with their tell-tale holes or deep dents made by flying shrapnel reveal the grim story of battle.

These Dumps in the field or immediately behind are something like the Unclaimed Baggage Rooms of a



railway company although they have a much more definite and tragic interest. They include field ranges, stoves, tools, trunks—all the trappings of camp and field. When a unit goes into action it must strip itself of all unnecessary impedimenta. Some of it is already war-worn. In the army if anybody is in doubt about the disposition of anything it goes to the Salvage Dump, which accounts for its heterogeneous quality. At one Dump I saw a banjo with scores of inscriptions on the drum. It had evidently belonged to a college boy who had beguiled his comrades with it on the troop transport that brought them over. With the curious tenacious affection that soldiers display for trinkets they bring from home he had lugged it up to the Zone of Advance and only relinquished it when he began to play a more dangerous and difficult tune than he had ever twanged out on catgut strings. His banjo then probably became a machine gun.

All the salvage material brought in from the field of battle is not damaged. When our victorious troops swept through the St. Mihiel salient they found ample evidence that they had given the Germans a real surprise. In the dug-outs of the Boche officers were pianos, phonographs and elaborate writing desks, all left intact when their late owners beat a hasty and precipitate retreat. This reminds me of a striking war contrast that was revealed one day during Pershing's first great offensive. A group of exultant doughboys assembled for a breathing spell dragged one of these captured pianos out in the open. A husky New Yorker, using an ammunition box as a

stool, began to pound out American rag-time. Out of forty German pianos gathered up after this historic victory five were of French manufacture which showed that the barbarians had looted French houses and even carried away heavy plunder.

In the Zones of the Armies the soldier is never permitted to forget that salvage is one of his first obligations. The injunction is painted—and sometimes in an amusing fashion—on signs that you see everywhere. I used to think that the British salvage reminders were striking but ours go them one better. Once, for example, I saw a piece of German equipment upon which a facetious American had left this sign: "MADE IN GERMANY; TO BE SALVAGED FOR AMERICA."

One of the frequent signs read: "IF YOU DON'T WANT IT—SALVAGE DOES." Another that greets you on all sides is: "WHAT HAVE YOU SALVED TO-DAY?" A characteristic sign says: "EACH TON SAVED HERE MEANS A TON SAVED IN SHIPPING." No injunction is more characteristic of the American spirit, no less irrepressible in war than in peace, than the one which proclaims: "IF YOU ARE TOO BUSY PHONE US—AMERICAN SALVAGE." Other salvage signs have these inscriptions: "DROP IT HERE;" "THIS IS OUR DUMP—WHERE'S YOURS;" "PREPARE FOR WINTER—SALVAGE IT."

It used to be the fashion to pay no attention to so-called "duds," which are unexploded shells. They are now salvaged and add considerably to the ammuni-

tion supply. Throughout the whole area of the armies you can find signs which urge shell conservation. One of the most familiar boards reads like this:

"DON'T WASTE SHELLS. THEY ARE INTENDED FOR FRITZ, NOT FOR WASTE."

Material for salvage, whether enemy or American, is removed from the Advance Dump which is always in the combat area and conveyed to the Army Dump which is located behind the lines and at Railheads. Here the first sorting takes place. Great care is exercised to see that ammunition is withdrawn from clothing and belts. The property is then carefully scrutinised to find out if it is fit for immediate issue which is often the case with captured stores. Material and equipment only slightly damaged is repaired at the Army Dump which is usually equipped with portable repair shops mounted on five-ton motor-trucks.

Articles which must go to permanent Salvage Depots are shipped by railway. Salvage cars are part of every train that goes back from Railhead. So extensive has become the bulk of Salvage that it has its own Regulating Station. During one week in August exactly 195 cars, containing wrecked material, were loaded and sent out, and these did not include big guns and motor transport, which are a considerable item.

Each Salvage Depot specialises in reclamations. Clothing, blankets, leggings, rubber and leather equipment, underwear, field ranges, helmets and trench tools, for instance, go to the vast plant just outside of Tours. Range finders, trench periscopes, watches, compasses, machine guns and automatic rifles are

shipped to a huge Ordnance Salvage Station up in the Advance Section; medical, surgical, dental, veterinary and X-Ray instruments go to a highly organised repair shop in Paris; motor transport, rolling kitchens, bicycles, motor-cycles and wagons are shipped to the automobile factory somewhere in the Intermediate Section that I described in the preceding article in this series. There is a special factory for the redemption of gas masks and also one for Signal Corps apparatus which includes radio-vehicles and field telephone and telegraph sets. The salvaging of big guns is done in a complete foundry and machine shop that is an annex of the Ordnance Service.

The moment that an article, whether a belt or an overcoat, arrives at a Salvage Station it becomes part of a system of records no less complete than the machine that retrieves it. That is the reason why at the Tours Depots, for example, it is possible to issue every week a complete and itemised statement showing the amount of property sterilised, washed, salvaged and returned to circulation. It indicates the total value and amount of material shipped; the wages paid; the cost of new material used in repairs and operations and the relative cost of salvaging material as compared to its cost in the American, British or French factory. You discover that with the salvaging of a pair of shoes, for instance, the cost of remaking as compared with the present war prices for new shoes is less than one per cent.

One phase of Army Salvage deserves a little chapter all to itself because of the great lesson to peace that

it will convey. I mean Food Conservation, which is technically known as Kitchen Economics. Here we show the distinct influence of the British system which has reduced the reclamation of refuse to a science that is little short of remarkable. England was forced to adopt drastic measures, first because of the immense waste in the army kitchens; and second because of the high price she was paying for glycerine which is one of the essentials in the manufacture of high explosives. To understand the connection between waste redemption and high explosive let me say that animal fat produces soap and one of the by-products of soap-making is glycerine. One hundred pounds of fat produce ten pounds of glycerine. All the British army fat is now bought by a group of soap manufacturers known as the Committee for the Purchase of Army Refuse. By this arrangement the Ministry of Munitions secures glycerine at \$250 a ton instead of \$1,250 which was the price before she began to reclaim army garbage.

We did not suffer the same waste in our army kitchens for the reason that, almost from the start of our overseas adventure, the Army Salvage System anticipated extravagance and put a premium on economy by making it profitable. It introduced a complete process for the salvage of kitchen by-products which mean all camp waste such as meat, bones, fat and drippings of all kinds, stale bread and the burlap and wrappings from frozen beef. These products are rendered into fat whenever possible, or sold in the form in which they emerge from range or table. The

price is fixed every six months. At the time I write the price per hundred-weight of marrow bones was \$3.36; for first class drippings \$15.36; for butcher's fat \$7.44; for cracklings \$3.54, while the quotation on scrap bread was \$3.40 for each hundred pounds. The proceeds go to the Company's Messes and are used for luxuries.

Wherever possible the cook is required to use up his waste products on the premises. When he has an excess over his own needs he assembles it in containers and it is hauled off to the Field Fat Extracting plants where it is reduced to fat. The material is treated in boiling tanks through which superheated steam is passed. The fat is run out, put in barrels and is purchased by the United States Government, which thus performs for our army the same service that the Committee for the Purchase of Army Camp Refuse does for the British.

No army cook in the A.E.F. is permitted to forget the fact that America expects every scrap of food to do its duty. In every cook-house or camp kitchen is a big chart which contains the following admonition in large letters at the top:

"With a view of impressing all units with the importance of preserving and rendering all available fats the following chart is issued to show the source from which fats can be recovered and the methods of treatment. The preservation and treatment of all fats is not only necessary from an economical and cook-house point of view but it has become also of national im-

portance. These fats are used for 'dubbin,' soap and glycerine to make explosives."

The chart indicates precisely how recoveries of fat are made. First of all the cook is shown in simple text all the sources of fat which may be obtained from raw meat, the processes of cooking, waste bones, refuse, or the scrapings from tin cans or meat wrappings. He is also shown how to treat meat and bones so as to obtain the fat and he is further taught how to utilise it. This chart is also full of helpful hints for kitchen emergencies. If there is no butter, for example, butcher's fat may be rendered down and used as a substitute. By the same process so-called trimmings from raw meat may be rendered and used in baking cakes or biscuits, and so on.

The Salvage System permits no guilty scrap of food to escape. Even the bakery sweepings are gathered up and sold for \$2 a hundredweight while the swill is disposed of to French farmers who pay 50 cents a barrel for it. Our empty tin cans, kegs and barrels are used as containers for the fat when it is shipped while the flour sacks are sent up to the front for sand bags.

Most people will probably be surprised to know that the American Army manufacture some of the soap that is used in France. It is made out of the fat rendered from kitchen waste. Most of this soap is absorbed by the field laundries which comprise an important branch of the Salvage Service. These laundries range from a portable Motor Divisional establishment drawn by a tractor which provides power to

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drive the washing machines and transportation as well, to a huge, permanent plant which washes the linen of a Base hospital with a capacity of 30,000 beds.

The whole process of reclaiming kitchen waste has a much larger value than merely saving army food and adding cash to mess funds. Upon the cook, his helper, and indeed upon every man in uniform who comes in contact with this organised economy is impressed at first hand the lasting virtue of conservation. He finds that instead of impairing the quality of the food he eats this utilisation of waste improves it. The luxuries that he is enabled to enjoy as a result of this thrift demonstrates that saving has its dividends. When he goes back home after the war, resumes civilian life, and goes to grips again with that most eternal of all evils, the High Cost of Living, which may be even higher than ever, he will be able to adapt himself readily to whatever economic emergencies may arise. He will be able to make his money go further than ever before. Here you have one of the many permanent compensations of war.



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## X—*New Men for Old*

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**R**ECONSTRUCTION of equipment is a machine-line process that deals with unresponsive things. We can now proceed to the phase of salvage which touches the human being and which is rich with an interest—even a fascination—rarely met with in war. Technically and baldly known as Classification of Personnel, it is, in reality, the agency through which wounded men are redeemed; made fit for continued work in the army and beyond that, equipped for the struggle of life that must come when the sword is sheathed. It involves a scheme of conservation of man-power that is not only based on an economic principle but meets a military necessity at the same time.

No one need be told that the successful prosecution of the war demanded that every man in uniform, whether officer or private, should serve where he could serve best and where he could utilise his particular skill and ability. An army of misfits is a handicap. A trained man misplaced becomes an untrained man. A civil engineer, for example, assigned to an infantry regiment throws away years of costly training needed elsewhere. In the same way the technical training of a gas expert assigned by mistake to the Aviation section is totally lost to the Service. A machinist is

worth probably ten times more in a machine gun battalion than in a headquarters troop.

The War Department has provided an antidote for all this in the vocational deployment of men through what is known as the Personnel System which deals with Casuals, the unassigned troops who come from the United States, and with all the temporarily and permanently unfit soldiers who are shunted from Evacuation hospitals and Convalescent camps into a central clearing-house which classifies them according to their mental and physical capabilities. It deals therefore with casuals and casualties and very properly may be called a Human Salvage Station.

If you want to see how this extraordinary system operates you must come with me to the charming little town of Blois that overlooks the Loire. Nature must have had some vague intimation long ago that in this restful verdant nook the maimed veterans of America's Army of Freedom would come for sanctuary and to get a fresh grip on usefulness. It is a picturesque little community with crooked streets and with the usual *Caserne*—a quadrangle of barracks—which is now the nerve-centre of our army recuperation.

To this place the able-bodied casuals are sent direct from their port of entry into France for assignment. With these so-called Class A men who are part of a replacement draft from the United States it is an easy matter of assignment to a Combat unit. The big problem is with the soldiers who have been wounded in battle or otherwise injured, who have been discharged from hospital and who present just so much

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human material to be salvaged for service. It is with this group that we are chiefly concerned.

Just as soon as a man is discharged from hospital he must appear before a so-called Disability Board which grades him and recommends the Service for which he is suitable. Like all other armies we have various Classes. Class A, as I have already intimated, is men physically fit for combat service. Class B-1 includes men temporarily unfit for fighting but able to do hard work in the meantime, while Class B-2 includes those temporarily unfit for combat service and able to do only light work in the interim. Class C-1 is composed of troops permanently unfit for combat service but able to do heavy work in the Services of Supply; Class C-2 comprises soldiers permanently unfit for combat service but able to perform light work in the S.O.S. Class D men are unfit for all duty with the American Expeditionary Force and usually go home honourably discharged.

With a knowledge of these various Classes in your mind you can readily see how difficult is the task of allocating thousands of men, each one with his own little bit of experience back in the States, which must be capitalised to the fullest extent and yet not subject him to exertion or hardship that will impair his health or render his man-power unavailable for the army. Complicated as it may seem the whole work of classification and reclassification is so highly organised that between morning and evening a man can arrive at this Station, undergo thorough examination, obtain complete equipment and be on the way to a proper and

suitable station. I have seen similar systems in other armies but the American scheme of readjustment leads all the rest.

These results are made possible by what may be called a Chute System. The enlisted man who may have lost all his baggage, who has only the clothes on his back, a freshly-healed wound in his side and a most doubtful state of mind as to what is to become of him, enters a door and by pursuing a continuous path emerges in a few hours bathed, shaved, fully equipped, financed, with bulging barrack-bag in his hand, and a little card in his pocket which assigns him to a job that is both useful and congenial. He never doubles on his tracks. So thorough is the automatic transformation that it sometimes seems like a dream to the men who have been through this most humane of all mills. Let us now see how it works.

This Chute which is for all the world like the famous animal run-way in "Packingtown" in Chicago is located in a large building known as the Classification Barracks. All enlisted personnel enter in single file. Each man carries in his hand the Report of the Disability Board that has examined him and which states his name, number, army unit; the nature of his disability and whether it existed before or after he entered the army; his classification, that is whether he is Class B or C; and the nature of the duty recommended for him by the Board. He is now handed a sheet of paper—an Inspection Slip—which contains an itemised list of what will happen to him on his journey down the Chute. As these things happen they

are checked off. First of all the man is registered, after which he passes on to a desk where he can take out War Risk Insurance and re-arrange the allowance and allotment for his family. If he has no insurance already this formal reminder is likely to equip him with a policy. Next comes an examination for disease. After physical examination is the Vocational classification. In front of the Examining Sergeant is what is known as the Index of Occupation, a large chart which contains the list of every job that the average man can hold. Each one has a number. The three most common occupations are Factory Worker which is Number 1, Farmer which is Number 2, and Labourer which is Number 3. Each man is required to give his life's history in terms of work. It includes the last firm that employed him; its address; the kind of work he did; the wage he received; whether he exercised authority or leadership; how long he worked; and also a list of any other jobs or occupations that he may have had. Included of course is the usual personal information.

All these facts are written on a large card which is technically known as Qualification Record. At the top of this card is a scale of numbers corresponding to every one of these major occupations on the Index of Occupations. Just as soon as this card is filled out a red marker is put over the number indicating the man's qualifications for work. In the case of a motor mechanic it would go over Number 24, which happens to be the index number for this particular job. When the cards are filed the Assignment Officer can see at

a glance how many men he has available for every job.

The Qualification Record filled out, our man now continues his journey down the Chute. The next station is the Pay Department. Many men leave hospital without a cent. In order that they have some pocket money each man is given an advance of \$7.50 on his pay. After financial needs are met assignment is made to Companies by physical qualifications. This means that all B-1 men would be put in one group. Each man is given a Barrack Bag which he presents at a miniature Department Store where it is filled with clean underwear, socks, field shoes, razor, tooth brush and paste, and where he also gets the daily ration of tobacco. Adjoining is a bath-room where, with soap and towel provided at the Equipment Counter, he cleanses himself from head to foot. As a final touch he can, if he so desires, end this remarkable overhauling journey by sitting down in an American barber-chair in a sanitary barber-shop and have his hair cut or his face shaved before emerging a new man.

Now you can understand what I meant when I said that more than one soldier has believed that the Chute process was a dream. Despite its thoroughness exactly twelve hundred men have been classified in these Barracks in a single day. The moment that the man emerges he is marched off to the Barracks, put in charge of a Non-Commissioned Officer who issues a Travel Order which indicates his destination. From a Location Slip he knows for the first time that he is to go to Salvage Depot X, let us say, and that he is to start at 8 o'clock the next morning. In the mean-

time he has an opportunity to stretch his legs; listen to a band concert composed of temporarily unfit soldiers or even watch a boxing bout which is one of the great entertainment features every evening. In summer a baseball game is one of the daily diversions.

This Human Salvage Station is a gold-mine of incident that reveals the character of the American soldier. Here is a typical case. When a Casual Company is sent off in a body the Travel Order sometimes contains a hundred names with considerable data after each one. Four copies must be made—all by hand. One night the officer in charge of the Classification Barracks, Lieutenant William R. Quinn, was told that two brothers, both wounded at the same time and devotedly attached to each other, were to be separated. The Travel Order which divorced them contained a hundred and fourteen names and had just been written and distributed. These boys did not want to be separated. In order to keep them together it was necessary to rewrite the Travel Orders which would mean hours of work. The Barracks clerks had worked from 7.45 o'clock in the morning until 10.30 at night every day for weeks, yet when Lieutenant Quinn stated the facts every man volunteered to re-write the papers in order that these two brothers might remain together. This performance has been duplicated several times. It disclosed the fact that there are hundreds of groups of brothers in the A.E.F. Frequently you find three, even four, members of a family in the same unit.

Here is another instance of character. One day

a little Marine hardly up to the minimum requirements of height and weight showed up for classification. He had been badly gassed and wounded. Having been a stenographer in New York, he was attached to the clerical force at the station. A few days' work, however, convinced the officer in charge that he could not stand the indoor labour so he was given light outdoor duty. One night he approached a comrade and asked if he could borrow a hundred francs.

"What do you want to do with this money?" asked his mate.

"I want to beat it A.W.O.L. (Absent without leave), shoot across France and join my outfit in the trenches," was his reply.

This bantam who still had the German poison in his system and who was physically unfit to do a full day's work was willing to break the rules, subject himself to a Court Martial in order to get back to the fighting front.

On another occasion a young boy of Austrian birth was making his way down the Chute. He still limped from a wound in his leg. At the Vocational Desk the officer asked him:

"Are you an American citizen?"

"Yes," replied the boy with pride. "A German bullet made me one."

During my visit to the Station I overheard a characteristic conversation between two men who had just been evacuated from hospital. They were both of German origin. One of them asked the other:



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"How did you like shooting at your German cousins?"

Quick as a flash his companion answered:

"They deserve all they are getting and I'd give it to you if you were on the other side."

Such is the spirit of the fighting American who is never so badly wounded but that he wants to get back into the fray again.

All the men assigned to this remarkable institution are not sent away at once. It becomes a sort of Rest Camp where men get final recuperation (pending the establishment of the great Recuperation Camp now in process of construction) and where, with the sense of utility which marks our whole army endeavour, they are made fit in every way. You find here a School for Stenographers, which in ten days was able to provide the army with fifteen capable typists. These men had had previous experience, to be sure, but many months in the army had dulled their capability to a considerable extent. In the School, which is in charge of a field clerk who was a Professor in a Commercial College in civil life, they got back their old time skill.

Other educational features include schools for cooks and bakers, filing clerks, horse-shoers, farriers and carpenters. There is also a special course of instruction for Non-Commissioned Officers in the art of handling men, office detail and incidental details, all of which will start them on the road to a commission.

This system of classification has a bigger signifi-

cance than merely adapting permanently or temporarily unfit men to an army job. It is preparedness for the future. Nothing wears out men like war and no war like this war. Out of this process will emerge tens of thousands of men better equipped for peace. It is making our overseas force an army of specialists.

Full brother to the institution that I have just tried to describe is the great American "Blighty" which is now being established nearby. After four years of war the average American need scarcely be told that Blighty means England for the British Tommy. When one of them gets a "blighty" it means that it is a sufficient wound to take him back home. America will not be able to send her wounded men home so she will bring the comforts of home to France.

When the first American Casualty Reports were flashed by cable from France to the United States there leaped from many American hearts and homes the swift and tremulous question:

"What is the army doing for my wounded boy?"

The huge Recuperation Camp on the Loire is the army's answer to this question. Amid wooded groves and with every convenience that makes life worth redeeming is rising this sanctuary where the doughboy can come from Evacuation Camp and travel gratefully back to strength. The only detail missing will be the loving presence of his family. It will be a sort of Army Elysian Field on Earth. Aside from the human aspect this immense project is a sound military and economic enterprise for the reason that the average cost in time, effort and sub-

sistence of each individual evacuation from a hospital camp to this haven of rest and recovery is much less than the similar cost of individual replacement from the United States. It means New Men For Old without drawing on the reserves at home.

So far I have dealt with the classification of enlisted men. Now we come to the kindred allotment of officers which brings us to the threshold of the Military Confessional, in many respects the most unique and original human institution in the whole A.E.F. Save to those who have found hope, faith, and a new life within its sympathetic walls it is scarcely known. Yet this establishment stands at the cross-roads of the sometimes tangled highway of army life and points the path to fresh careers. It is a living rebuke to the old theory that War is a brutal and unsympathetic thing. I know of no activity which more completely or unalterably reflects the ideals of the American Army.

With officers, as with men, square pegs are often stuck into the round holes. In other words the wrong man is put on the job and makes a hash of it. In most other armies the man found to be temperamentally unfit to lead troops or even for some desk task is often sent home. He feels that he is disgraced and he frequently spends the rest of his life eating out his heart in remorse and regret. He makes himself a marked man and his usefulness to society, in most instances, ends. With the A.E.F. such a man is given a chance to make good. Regeneration is put squarely up to him. The story of how this oppor-

tunity is offered lifts the routine and the humdrum of so-called Reclassification to the realm of a real romance. It is genuine character building.

The first question that naturally arises is: How are these officers segregated? The process is very simple. As soon as it became apparent that officers were misplaced in the various Staff Corps and Departments (such misplacement was inevitable in the hasty mobilisation of a huge army), a Personnel Bureau was established at the Headquarters of the Services of Supply at Tours to deal with all problems relating to officers physically or otherwise unfit for front-line work and to give them a chance elsewhere. It was placed in charge of a Deputy Chief of Staff who by the very circumstances of his birth, his whole army experience and his outlook on life was an inspired choice. This man is Lieutenant-Colonel M. R. Wainer, whose story is as picturesque as his post. He was born in Russia and was brought to America as a child by his immigrant father who settled in the Middle West. The boy yearned to be a soldier; it was impossible for him to go to West Point so he enlisted as a private and worked his way up to a commission. He has journeyed over the rough places himself; he knows and understands men; he was therefore eminently qualified to assume the rôle of Father Confessor to the Army, for such he is.

It was not long before the disciples gathered at his door. They came because a certain memorandum was sent to all Bureau Chiefs. This document so completely dramatised the spirit of fair play and a

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square deal in the army that I am reproducing it in full. Here it is:—

"If there is any officer in your department, in any grade whatsoever, whom you regard as incompetent that officer will upon your recommendation be sent to the Reclassification Station. You can safely count on the fact that unless it be by accident he will not be returned to your department.

"It is not necessary in recommending this officer for reclassification that you state any reasons for desiring to get rid of him, but in order to assist in the reclassification of the officer, and to better place him in some other field where his services may be more useful to the United States, every such case should be accompanied by a frank statement of the officer's qualifications and disqualifications so far as they have been developed while serving in your department.

"It should be understood that the policy of the Commanding General, S. O. S., is to make a readjustment of personnel so as to get the maximum advantage out of every man's service. It frequently happens that a man who is totally unqualified for one class of work is well qualified for another, and however worthless an officer may appear to be from your viewpoint it may be that his services can be used to some advantage in another field."

This memorandum is the basis for the adjustment of all misfit officers and it has been the mainspring of some real human miracle working.

Likewise a General Order authorises Division, Corps and Army Commanders to relieve such officers as are considered unqualified for combat duty of their commands, and send them back for Reclassification.

All officers ordered for this reclassification are first ordered to the Human Salvage Station which I described in a previous section of this article. The papers giving the available data as to their qualifications, civil occupation and the reason for their relief are then sent to the Commanding General of the Services of Supply. Upon receipt of these papers the Personnel Bureau at Tours orders the officers to report there. Upon arrival they are required to fill out an Officers Qualification Card, which is somewhat similar to the Qualification Record filled out by the enlisted man although it does not include the vocational list. It contains the usual personal information. The officer himself indicates the Department or Branch of the Service in which he thinks he would be most valuable and his qualifications for the work. He must also state what educational advantages he has enjoyed; what foreign languages he can speak, and state any previous army service.

Every officer who comes to Tours for reclassification has an interview with Colonel Wainer which is, in many respects, the most important detail. Before he enters the Confessional the Colonel has read the man's record. He can therefore talk to him with knowledge and authority. More than one officer has entered that sanctuary cocky, even defiant, and protesting against what he regards as an indignity. Always he emerges with a smile on his face and with hope in his heart. This big-souled Deputy Chief of Staff who rose from the ranks knows how to place men. He has before him an up-to-date list of needs

in the Services of Supply which grow so fast that there is always a demand for officers. He is therefore able to assign men to jobs where they are sorely wanted and where the welcome, first born of need, is a stimulus. The demand for officers, I might add, usually exceeds the supply. No matter what highly specialised experience is represented there is invariably a place to use it.

A complete card record is kept of every officer reclassified for incompetency or temperamental unfitness. For the purposes of army records he is known as a "Thrown Back" or a "T.B." for short. Like that other and more deadly "T.B."—the Great White Plague—he can usually be cured. This card system is itself a marvel of completeness and efficiency. A card with a green flag in the centre, for example, signifies an officer reclassified for physical reasons. A card with a blue flag in the upper right-hand corner shows that it is the brief biography of a "T.B." sent back from the front for temperamental reasons.

All reclassified officers are placed in four divisions. Class 1 is composed of those who, while rendering satisfactory service, have requested their own transfer for personal reasons. Class 2 are Misfits who have failed to render efficient service and who are not sufficiently inefficient to justify an Elimination Board. Class 3 includes all officers for whom an Elimination Board has recommended a transfer to another branch of the Service. Class 4 is officers whose discharge has been recommended by the Elimi-

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nation Board but who are being given another chance to qualify somewhere in the army.

Since I have referred to Elimination Boards it may be well to explain their function, which I will do with a concrete example. If the reclassification of an officer sent back from the combat area for inefficiency indicates that he holds too high a rank for his new post in the Services of Supply he is ordered before an Elimination Board with a view to his demotion to a grade more nearly in accord with his capability or to conform with his discharge if a dismissal is recommended. Thus the Board's job is to eliminate or to appraise men and ranks.

Some officers have appeared several times before Elimination Boards. This procedure is in line with the policy outlined at General Headquarters, which is that no officer shall be discharged from the service of the United States except for misconduct or some similar reasons and until he shall have been given every possible opportunity to prove his fitness in any capacity. No man was ever dismissed from the A.E.F. without good and sufficient reasons and only after he had had every chance to redeem himself by service. In this spirit of justice you find the incarnation of the character of the grave-eyed man who is the Commander-in-Chief of our Armies abroad.

Reclassification often develops the fact that men fail in the army merely because they are put on a wrong task. If it is apparent that an Aviation officer lacks the fundamental qualities required in this branch of the Service, and his training, civil occupation and



personality fit him for duty with the Quartermaster Corps he is assigned to that immense domain. If he proves his adaptability after a certain time, and upon receipt of a recommendation from his superior officer to that effect, General Headquarters vacates his Commission in the Aviation section and re-commissions him in the Quartermaster Corps.

Wherever a man is reclassified for inefficiency a confidential letter is sent to the Section Commander, or the Department to whom he reports, explaining why he is assigned. His case is quietly and tactfully "followed up" without the slightest bruise to his pride. The only men who have ever failed to qualify under this humane, sympathetic and considerate process are those professional and confirmed rotters of whom the army is well rid and who have only themselves to blame for their downfall.

In the case of officers who are reclassified for physical disability due consideration is given to their condition as shown by the Medical Report. Their assignment depends upon their qualifications and the duties they are able to perform. After a certain specified time these officers may ask for a re-examination. If they are found to be physically restored they are placed on a list as available "for return to combat." They go back to the fighting job as soon as an officer becomes available to replace them on their present assignment.

It only remains for me to disclose a few intimate chapters on the Roll of Salvaged Honour recorded by the reclassification of officers who have been given

that second chance and who have found both glory and compensation in their remaking.

One day a southern Colonel entered the Army Confessional. He had arrived in France in charge of a splendid battalion. In the training camp he gave every evidence of skill and tact. The moment he got his troops up in the combat area he displayed a temper and inability to handle men in an emergency that not only made him conspicuous but led to his being ordered back for reclassification.

This man was proud and sensitive; he had been in the National Guard for twenty years; all this time he had dreamed of the hour when he would lead troops in actual battle. When that great moment arrived he was found to be temperamentally incapable and no one realised it more than he did. All that he could see ahead of him were years of poignant regret and bitterness. Instead of rebuke he met with kindness; where he had expected reproach he found a helping hand.

"What would you like to do?" asked Colonel Wainer.

"I want to do a man's job somewhere in France," was the reply.

He got his chance. At a certain port much used by the American Expeditionary Force you will find this Colonel erect, buoyant, full of pride in his task and likewise a pride to the uniform he wears. He has found the social field in which his personality has full swing. He is merely one of many splendid

men who have found themselves after devious army wandering.

The Army Confessional knows neither caste, creed nor colour. Not so very long ago a negro officer was sent back from the front as unsuited for combat work. He was so indignant that he had done that most rare of all army things—sent in his resignation. Colonel Wainer knew that the man had character and that it only needed to be pricked into life so he asked him point-blank:

“Are you still loyal to your country and your flag?”

“Yes,” responded the man, “of course I am.”

“Then you should be willing to serve it in the best way that you know how,” retorted his questioner.

To-day that officer who was willing to quit the service in a fit of pique and face rebuff at home is rendering admirable service with a Stevedore regiment where his men almost idolise him and where he is a credit to his race and his cause.

These heart-to-heart experiences are not without their element of humour as the case of another negro officer will show. When Colonel Wainer asked him: “What is your trouble?” he immediately replied: “Well, boss, it’s this way.” His first words of course showed that he had failed in the first principles of military requirements and that he was still a waiter on a Pullman dining car. When the proposition of serving his country was put squarely up to him he was ready and willing to go before an Elimination Board and serve in the ranks as a private soldier. He has been in the thick of the fray ever since.

In this Confessional human nature stands uncompromisingly revealed. Men blame every one for their errors save the right person who usually is themselves. Frequently they protest that it was not inefficiency that brought them back from the front but because they happened to be in a regiment composed of men from various States and that the predominating officers in the unit want subordinates from their own Commonwealths under them. These cases are invariably without foundation because investigation proves that the officer himself is to blame and that he has not given the proper support and loyalty to his Commander. Such men are assigned to duty in the Services of Supply where, relieved from the friction engendered by sensitive State pride, they have given excellent accounts of themselves.

Again and again there are examples of men merely misplaced. A young man of twenty-five who had been a successful commercial painter found himself in a Field Battery and was sent to a school for instruction and training in the intricate and mathematical problems of artillery. Of course the work was not congenial and he was sent to the rear for classification. His proper station was Camouflage, to which he was assigned and where his special qualifications have already won him the highest praise. It is a typical illustration of the work that is being done daily in making the army more keenly fit to do its great task.

When you sum up the whole process of reclassification you find that, as with so many other phases of

our army organisation, it is building for peace as well as for war. America, like England and France, will face a dearth of skilled men in industry when the world no more sees red. Competition, which was merely part of the orderly development of a people before the war, will be a bitter battle for economic existence after the war. The struggle to live will be comparable to the struggle for freedom to-day. The nation that can swiftly mobilise both its trained workers and its trained leaders will have a flying start on all its rivals. The race toward rehabilitation will be to the swiftest. In the classification and reclassification of officers and men is one guarantee that the United States will be able to segregate quickly an army of specialists which will be a tremendous factor in all the arts and crafts and which will enable us to maintain our world-wide industrial supremacy born of the needs of conflict.

Meanwhile down in that little room at Tours every day men are getting a rebirth of character, courage and what is equally important—self-respect. We are not only saving Human Tonnage but Human Careers as well.

It is the Highest Salvage.

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## XI—*The Marvels of Army Organisation*

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**I**F you should arrive in France and want to know at once the whereabouts of your son, brother or friend from your home town who is with an American unit somewhere in the field, all that you have to do is to get in touch with the Central Records Office of the A.E.F. and you can find out as quickly as the telegraph can transmit your inquiry and flash back an immediate answer. This personal intelligence system is just one more detail in the many-sided army organisation that is a marvel of efficient co-ordination.

We have been journeying through the major and therefore spectacular Services of Supply. Significant as are their activities, they only compromise a comparatively few sections of that vast and throbbing domain which feeds, equips, and unifies the overseas forces. We can now take up some of the other and no less vital agencies which form what may be called the subsidiary corporations of the American Business of War, Unlimited. They range from a life insurance company to the largest real estate operating office in the world. Included among them is a School for Citizenship, a complete Renting and Claim agency, a scientific Forestry Service, a job-printing plant, even a full-fledged newspaper of, by, and for

the army. Each in its way reveals a distinct phase of highly developed administration that is not only essential to some phases of the conduct of the conflict and the mental or physical upkeep of the men, but conveys a useful and constructive lesson for peace.

The Central Records Office is typical. We put the Card Index on the Commercial Efficiency Map. Hence no one will be surprised to learn that we have probably the largest one ever created and comprising, when you consider all ranks, civilians, prisoners of war, and other individuals connected with our overseas forces, more than two million names. This monster and up-to-the-hour directory makes it possible to locate every person who draws pay or property from the army and to know at a glance his or her past and present.

You find this huge institution housed in an immense structure in a pleasant town well up in the Intermediate Section. Here, hundreds of "Waacs," working as clerks and stenographers, perform the same admirable service for the American Army that they do for the British Expeditionary Force in that they release fit and semi-fit men for the front or for service in the Supply and Transport branches. At first sight the establishment makes you think of a Census Office, and such it really is. You hear the machine-gun-like rattle of batteries of typewriters; you see apparently unending vistas of Card Catalogue Cabinets; there is the charged atmosphere of swift and orderly action. All these Cabinets are in groups by Army Corps, Divisions, and smaller organisations.

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Each Cabinet bears a card which indicates the body whose records it contains.

Central Records, as it is more commonly known, is technically charged with "maintaining accurate and complete records of the entire personnel of the American Expeditionary Forces, civilians attached thereto, all the American prisoners of war held by enemy forces and all enemy prisoners of war held by our forces." This bald and more or less official outline of responsibilities covers a multitude of other details that extend from the entry of the army individual into this world to the final record of his passing into the next.

To accomplish all this the office is divided into various Divisions. Some of these Divisions are so large that they in turn are composed of three or four sections. Each has its separate and distinct function. The Mail, Record and Correspondence Divisions will illustrate. It not only opens, distributes, and files army correspondence for record, but conducts the courier service which daily conveys official documents from one Service to another. Likewise it handles, collects and replies to inquiries about the overseas forces.

The Card Index of the army personnel is an illuminating example of how Central Records works. Its main object is to provide what is known as a Master Card for every person connected with the A.E.F. It is no simple task. New units are arriving in France every day—indeed every hour. They come from every part of the United States. Men are con-



stantly dying from enemy action, disease or accident; forces are being shifted from one point to another, and sometimes this movement involves tens of thousands of men whose orders may come almost without notice. On top of this is the fact that staffs are reorganised; officers and enlisted men are shunted from Service to Service: there is incessant evolution. This eternal panorama of change must be focussed and every change recorded in the Army Directory. Now you can see just what a job it is to make the army index live and up to date.

It is only possible because every unit that comes overseas begins to contribute to the Central Records before it embarks. Just as soon as an organisation is ordered to France it is required to fill out a card for every member. At every port in France are so-called Statistical Officers who compare these cards with the passenger list of the organisation. If there is any discrepancy the organisation is immediately called upon to fill up the gaps. This preliminary work, I might say, is in charge of what is known as the Initial Information and Army Serial Number Division of Central Records.

Now we can proceed to the second stage of the Census, which deals with the army serial numbers. There is a serial number for every man in the army. The complete sequence of these numbers is on the books of Central Records. Let us assume that John Jones is number 1,000,000. As soon as he reaches France and the records of his unit pass through their proper channel his name is written alongside the

number 1,000,000 in the army register. Henceforth in all records of John Jones overseas that number will accompany him even to the identity disc that he wears attached to a string around his neck.

This brings us to the preparation of the Master Card which is the compact and concrete record of the soldier. This card is eight inches long and five inches wide. It contains the full name, army serial number, rank, organisation, complete home address; name, relationship and address of party to be notified in case of emergency; date of birth; place and date of enlistment or commission, date of arrival in Europe; location in France or elsewhere abroad; record of all transfers and changes which includes every promotion, capture, absence with or without leave or furlough. It also states the individual's occupation before the war. In the lower right-hand corner is a blank square that has a grim and tragic significance. It is the spot left for the photograph, diagram, or description of the place of burial.

On the back of the card and under the head of Hospital Record is space for the record of every wound, illness, or physical incapacity of any kind. It shows the date of the casualty, the hospital where the soldier was sent, the nature of the illness or wound; whether it was slight or serious and the hour and date when the trooper was discharged or died. When you examine one of these Master Cards there is precious little of vital importance about the soldier that you do not know. So complete is this Card Index that if you asked to see the record of the Commander-in-

Chief you would discover that it followed the same form as the card of Bill Brown, buck private in the X Division.

With the machinery at the disposal of Central Records it is comparatively easy to make out the original Master Card. The problem is to keep this card "live," as they say in business. This is achieved through the co-operation of every unit in the A.E.F. which is required to submit all casualties and changes in the status of its personnel to Central Records at regular intervals. From these reports the various changes are made on the Master Card.

Two Divisions of Central Records have special and poignant interest. One relates to Casualties which I shall describe later on in this book in connection with Graves Registration. The other is that section which deals with American prisoners of war held by enemy forces. As is the case with every other detail of the war, whether it involves the capture of a town or the record and treatment of prisoners, the Allies displayed an infinitely larger spirit of justice and fair-play toward their enemies than the enemies showed toward them. The German military authorities took a particular delight in intensifying the suspense of relatives and friends over the fate of those reported missing. Only those who have been through this long-drawn anguish can realise what it means to be kept in the dark concerning the whereabouts of loved ones. The phrase "wounded and missing," has whitened more hairs and racked more souls than all the definite news of death in action combined.

Under the international agreement the ordinary method of conveying information about prisoners of war is through the Red Cross. Central Records compiled the names of every German prisoner in our hands and they were sent expeditiously to the German Government by way of the accredited channels. The system of the American Business of War operates alike for friend and foe. Hence you find a Master Card for every Boche in our hands. The German has not been so considerate of our own men. Their much-vaunted efficiency has no heart.

The deeper you probe into the Business of War the more you realise its intimate parallel with every day commerce. War these days is simply colossal merchandising with men. Instead of converting raw steel into rails or girders it transforms the raw human being into a finished fighting man. To maintain its output every industrial concern must renew its machinery regularly to meet the wear and tear of incessant production. In the same way the army must renew its fighting machine, which is the soldier. Every day its ranks are thinned by enemy action, accident, disease—any one of the many perils that beset a huge force in the field. This army renewal is technically known as Replacement of Men, and it discloses another phase of scientific military organisation well worth explaining.

All new men for the American Expeditionary Force whether they are combat troops or in the Services of Supply mainly come from the same source, which is the draft. Likewise the great majority get their pre-

liminary training at home. The bulk are attached to some organised unit before setting sail for France. Between eight and ten men left the shores of America for the ports of freedom every minute. This steady stream of khaki must not only have a destination but it must meet some definite need, be assigned to some specific place, and take its orderly place in the fabric of our fighting force. How is this done?

Study the Replacement process and you soon find out. You discover that with men as with supplies we depend on what amounts to an automatic supply, which means that gaps in the ranks are regularly filled and that there is always a reserve to draw upon. Replacement deals with men for the Front and the Rear. Since this series of articles is concerned solely with the Services of Supply we will stick as far as possible to our bailiwick. It will serve to explain the system, first because it is a Self-Contained Empire and second because the troops comprise more than one-third of our overseas army.

Perhaps I can best convey the scheme of Replacement by saying that it is like banking. If you have a bank account and keep on drawing checks against it you exhaust the purchasing value of your checks if you do not keep on depositing in the bank. The army in France is in the same position as the individual. It is constantly drawing on its human deposits in America, which are the training camps. Since the A.E.F. makes out a check every month in the shape of a big Replacement Order it follows that Uncle Sam in his turn must have the available trained

men ready. Through the draft he keeps on depositing men in the human bank, which is the army at home. Hence the army must keep books on men just as it keeps books on everything else.

All this means that General Headquarters in France must know exactly how many men are available in America all the time. Hence you can see up there a blue chart which shows every Division in the American Army at home and abroad. The units in America are indicated by a white square. The moment that this unit arrives in Europe a smaller square is placed inside. A glance at this chart shows what troops are at home and what are overseas. The process which registers these results is packed with detail and registers high tribute to our organising genius.

Let us begin at the beginning, which means that the machinery of supplying men for France starts with the Section of the General Staff known as G1 whose functions I described in a previous chapter and which is the Great Army Provider. Every requisition for men, like every requisition for food, clothing, engineering material or equipment, must pass across its desks. Although the G1 at General Headquarters is the senior Section and has general authority in requisitioning men, the G4 of the Services of Supply also has a responsible task because every man that sets his foot on French soil comes under its jurisdiction first. G1 at G.H.Q. gets him to France and G4 of the S.O.S. equips, transports him to his training

area and gets him up to the front where he comes under the authority of G.H.Q.

In order to get at the very first step in Human Supply we will be obliged to step out of the A.E.F. for a moment. It takes us to a charming little town in France which will be a post-war shrine for the reason that in a simple structure on a side street sits the Master Strategist, Marshal Foch, the Hammer of the Hun. With him is vested the Supreme Unity of Command of the Allied armies and especially those fighting in France. He moves the pawns on the checker-board of life and death because all major orders for troop movements emanate from him. It is Foch who determines what men are needed for offensives and this in turn determines the number of men required to equip, supply and transport them. Thus the Human Demand so far as the American Expeditionary Force is concerned, really begins with Foch in conjunction with General Pershing.

Let us say for the sake of illustration that 350,000 men comprise the monthly shipment to France. This number includes two separate and distinct groups. One is the regular, normal addition to the army; the other includes the men needed to renew losses at the front or in the rear and is the so-called Replacement force.

This again brings us bang up against the supreme problem of the A.E.F.—Tonnage—which applies to men no less than it applies to material. Every unit in France wants all the men it can get. Normal increase and Replacement therefore become matters of

careful tonnage allocation and GI at G.H.Q. does the allocating. First of all both Front and Rear file their requisitions of human needs. If the army has been in a big offensive its demands are greater than usual because it has had casualties. In the same way if vast new construction projects in the Base or Intermediate Sections have been launched and must be pushed through to early completion there is an abnormal requirement for additional Engineering units. If the demand for men at the front has made it necessary to send men from the S.O.S. up into the fighting line they must also be replaced. The emergencies that beat about Supply and Replacement are many and complicated. GI sifts out all these needs and does precisely what the Chief Quartermaster does with regard to his tonnage allotment. It makes up a Priority Schedule which indicates the urgency of the human shipment. This Priority Schedule is based on a fixed arrangement called "Schedule of Priority of Shipments" and which is the Convoy Bible. It is divided into Phases. Each Phase includes a certain number of troops for the Combat Army and a certain number for the Services of Supply. In Priority, as in everything else, you realise how all-important the S.O.S. is because there can be no fighting at the front without this unspectacular and bloodless fighting in the rear.

One reason why an up-to-the-hour check can be kept on Replacements is that for every unit in France there is a chart which shows the strength of the organisation. Let me illustrate with the case of a Di-



vision. On the left-hand side is an itemised list of its various kinds of units. Alongside is a column for "Authorised Strength" and another entitled "Present for Duty." Extending from each unit in the Division such as Headquarters, Infantry, Artillery, Supply, Engineer and Sanitary Trains and so on down the line is a horizontal black bar which indicates a scale of strength up to 100 per cent. If the bar radiating from Infantry, for instance, stops under the number 90 it means that the Infantry in the Division is 90 per cent of Authorised Strength. At the bottom of the sheet is a square which indicates "Replacements Required." If the Division is at full strength this square remains white; if 10 per cent Replacement is necessary it is so indicated. The sum of these charts in every branch of the Service makes it possible to know the strength from day to day and the Replacements required.

When all requisitions for Replacements are in, G1 sends a blanket cable to Washington specifying needs. The various kinds of casual troops are ordered by letter, which means that if G1 cabled X15000 it would mean that 15,000 Engineers were required for Replacement. In the same way Y may mean Medical Corps, Z Ordnance, and so on. I am using hypothetical letters. These troops come over unassigned. This is why they are known as casuals. Most of them go to the great Clearing-house on the banks of the Loire that I described in the preceding chapter.

Just as soon as troops are at sea or "floated," as the army phrase goes, they are caught up in a cease-

less system of scrutiny. The War Department advises G1 by cable the precise number and class of regular organisations and the total number of casualties embarked and on the way. The whole process now becomes visualised. If the convoy includes A Division which is intended for B army in the field there is already a blank square for this Division on the B Army Chart of Organisation which hangs at General Headquarters. So long as this Division is in America this space is white. The moment it starts for France half of the square is filled in with red. As soon as the unit arrives in France the square becomes all red. Meanwhile G1 has advised the armies in the field or the Services of Supply just what troops are on the way in the same way that the Quartermaster Corps or the Engineering or Ordnance Services are advised of the shipment of needed supplies. This complete system of advice makes for an efficient use of manpower in the army.

The remarkable document known as the Daily State obtains with human as with material needs. Every day there is placed on the desk of the Commander-in-Chief at G.H.Q. and on the desk of the Commanding General of the Services of Supply at Tours a type-written sheet which shows the total personnel—Combatant and Services of Supply—in France; the arrivals during that month; and the total debarked the day before; the monthly Human Demand; what has arrived; what is at sea, and the balance to come. Scientific supervision can do no more!

Just as soon as troops—whether assigned to Com-

bat organisations or Replacements—arrive in France they come under the administrative direction of G4. If they are intended for the Services of Supply they go where the Commanding General S.O.S. directs; if they are headed for the front they are distributed by order of G3 which is the Operations Section at G.H.Q. and which controls fighting. Combat troops arriving in units go at once to a training area for further training or to Barracks or Billets for a brief rest before going up to the Zone of Advance.

Since we are mainly concerned with Replacements and more especially Replacements in the Services of Supply we can now follow them through. All Replacements are casuals and are usually sent to so-called Depot Divisions which may be anywhere in the domain of the S.O.S. and which are often training centres. These Depots are for both officers and men. The men are kept in Pools and are withdrawn as the army needs or emergencies dictate. Each Army Corps, it is interesting to add, is required to keep a so-called Replacement Battalion which provides an accessible and immediate source of renewal to meet any contingency. This battalion is like the reserve supply of food and equipment kept at Railhead. It may never be needed but when it is needed it is wanted in a hurry.

It is vitally important that a complete record be kept of every soldier available. This means that at Tours you can see one of the most remarkable maps that the war has produced. I call it The Great Human Map of the A.E.F., for such it is. It shows

every section in France occupied by American troops. Red tags indicate Artillery; white, Infantry; grey, Mechanical Transport Units, and so on. In order to distinguish the two grand Divisions there is a pink mark on the tags of S.O.S. troops and a purple square on the cards of the Combat troops. On each tag is typed the brief biography, in terms of strength and movement, of the unit from the moment it landed in France up to the present time.

Why is this map necessary? I will tell you. Whenever G1 at G.H.Q. needs men for Replacement it simply asks the Adjutant General of the Services of Supply—Colonel L. H. Bash—"What have you?" and he can immediately supply the need. He does not look at the map, however. This map epitomises a remarkable Card Index which is part of the Adjutant General's office. There is a card for every unit, for every Replacement organisation, every officer and every casual that reaches France.

The card of the Division Replacement shows its present whereabouts; port of arrival; its various movements in the S.O.S.; its strength in officers and men, and the name of the Commanding Officer. The same sort of card is kept for a Machine Shop Truck Unit or for a Sanitary Squad. In the case of officers there is a pink card for each man. It records the complete story of his movements from his arrival in France. At the top of the card is a scale of numbers from 1 to 12 which indicates branches of the Service such as Infantry, Cavalry, Artillery, Engineers or Medical Corps. There is also a space to indicate

whether the man is a Regular or Reserve officer. A red marker is placed over the number indicating the officer's branch of the Service. If John Jones is a Captain in the Quartermaster Corps the red marker will be over number 8. If he is a Regular officer there will also be a green tag. If G1 wants fifty Quartermaster Corps Captains the Personnel Officer at Tours can see from the number of red tags over 8 exactly how many he has on hand. A different coloured marker is used for each branch.

From these cards the Weekly Strength Return of Replacements, Depot Divisions and Organisations in the S.O.S. is made up. It is for the week ending Wednesday at noon and is available the first thing every Thursday morning. It is a marvel of compact and classified detail. In the case of officers it shows the total by ranks from Second Lieutenant up to Colonel and also if they are attached, detached or absent for any reason. In the case of enlisted men it specifies grades from ordinary private up to regimental sergeant major. The Medical personnel is by grades and ranks and includes Chaplains, Nurses and Civilians. Likewise the Return shows all serviceable and unserviceable Mechanical Transport, horses, mules and guns. As a final human detail it reveals the army losses due to all causes during the week preceding and the number of men in training and the branches they represent.

The Return that I have just described is for the troops in the Base, Intermediate and Advance Sections. A similar Weekly Strength Return is made out

for all troops in the Zone of the Advance. The sum of these Returns made out at G.H.Q. makes the Weekly Strength of the whole American Expeditionary Force. It is the basis for much vital statistical compilation. At present it is hardly a source of aid or comfort to the enemy.

The average man who knows nothing about war usually has an idea that when troops go overseas they live in tents or barracks when they are not fighting. If this were true of the American Expeditionary Force a part of the army would spend a large portion of its time building quarters. Life is too short and the march of events too swift to permit any such luxury. Besides, labour and material are much too valuable. As a result many thousands of our troops are billeted during the period of their training or rest. The whole process of billeting, therefore, is a most important and highly necessary detail in the work of the S.O.S.

The mention of billets in connection with American troops discloses a picturesque fact. In the United States it is forbidden by law to billet troops. The reason dates back to the American Revolution when British troops were quartered on the Colonials and when this "hospitality" roused such resentment that the performance was never repeated under any circumstances. It is an interesting commentary on the whirligigs of time to find British homes thrown wide open to-day to American troops and what is more dramatic, to see the descendants of those Revolutionary foes fighting side by side for a common cause

on the battlefields of France. The whole billeting procedure was a new and novel experience for the doughboy.

At Tours and as a part of the work of G4 the whole Billeting Scheme for the A.E.F. is in charge of Colonel J. W. Wright. Fortunately for us the billeting of troops is almost as old as the French Army. Nearly every town or hamlet in France is billet-broke. For hundreds of years the cottages have housed troops. It has been reduced to such a science that I am not exaggerating when I say that there is a billeting quotation on nearly every rural domestic establishment in France.

Soldiers billeted in the houses of French citizens are, to use the expression adopted by the French Courts, "enforced guests" of the property owner and entitled to share the fire and candle with the family. All householders, with the exception of legal custodians of public funds, widows and spinsters residing alone, and female religious societies, are liable as part of their duty to the State to receive these guests and to share their fireside with them. For this the householder is paid one franc (20 cents) per night for each officer provided with a bed, 20 centimes (4 cents) for each non-commissioned officer and 5 centimes (1 cent) for each soldier. An additional 5 centimes is paid for each animal supplied with cover. If the animals are picketed there is no charge.

For the purpose of billeting we have divided France into Areas. At Tours a map of France subdivided into these Areas hangs before Colonel

Wright's desk. Just as soon as a Division is allotted to an Area a flag is stuck into its Area to show its location. The work of billeting the unit, however, started long before it reached France. As soon as the organisation sails from the American port G4, which is advised of the sailing, gets busy. It must determine whether this unit goes into barracks or billets. If billets are decided on the work of finding an Area begins at once. A Board of Officers, consisting of a Major of the Medical Corps, a Captain of Engineers and a Captain of the Quartermaster Corps, are sent out to find a suitable Area. These three officers represent branches of the Services that represent the most urgent needs to be met. This Board makes a careful inspection of all sanitary, water, and transportation facilities. The main idea is to reduce any new construction to a minimum. Available grounds for manoeuvring, drills and target practice are also important considerations. Thanks to many years of experience the Mayor of practically every French town has a Billeting List, which is a list of houses and barns available for troop lodging. The usual arrangement is to quarter the officers in houses and the men in barns.

When its investigation is complete the Board makes what is known as a Billeting Survey, which is a compact résumé giving the name of the place; population; location; nature of terrain; roads; railway loading and unloading facilities; billeting capacity for officers and men; warehouses available for subsistence and forage; bathing, stable, grazing, and garage space;



available sites for headquarters, hospitalisation, aviation, artillery parks, repair shops, drill grounds, rifle ranges, guard-house, and for any possible barracks to be built.

If this town or group of towns (which is often the case in an Area) meets requirements it is officially leased through the agency known as Rents, Requisitions and Claims (of which you will hear more later on) and is assigned to a Division. Just as soon as that unit arrives in France a G4 officer meets it at the port of arrival and escorts it to its temporary home where the American soldier gets his first real taste of French life and likewise his initial encounter with French language and customs.

While the Commanding General of the Division is the supreme authority in the billeting area so far as the American troops are concerned, the formal stewardship is vested with what is known as a Zone-Major, who corresponds to the British Area Commandant. If there is more than one town in the Area each one has a Town Major. If you have spent any time in French towns occupied by Allied troops, especially British, you know that the phrase "Town Major" covers a multitude of jobs and trials. He is supposed to be a combination of a Chief of Police, Truant Officer, Board of Health and Inquiry and General Repository of Troubles. At Ypres, for example, I have known three different Town Majors. Each time the post was vacated by death because the Town Major's office or rather cellar was below the only

building left with standing walls and under an almost incessant shell fire.

The best laid billeting plans, like those well-laid plans of mice and men, often go astray. If an Area is selected before the crops are harvested, for example, we sometimes lose as high as forty per cent of space because the French must use the barns for the products of their fields. In such a case we are compelled to build quarters. Again, when the avalanche of refugees came pouring down from the north after the great German offensive of last spring our soldiers voluntarily surrendered whole sections of shelter to these unhappy human straws caught up in the whirlwind of war.

When you touch the billeting of troops you reach the authority of one of the most interesting business institutions in the whole A.E.F. Technically known as the Renting, Requisition and Claims Service or, as it is called for short, "R.R. & C.," it is charged with a combination of routine and responsibility that makes it distinct among army organisations. Through its many-sided operations you discover that the American Army abroad is probably the largest real estate operator in the world and conducts one of the largest known Claims agencies. It is a unique development of the war and of the enormous task of providing all the land and buildings of every kind and description needed by our forces in France. Yet this immense task, involving incessant negotiations with a Government and a people who are sticklers for minute details and where the humblest cottage is the proverbial

"every man's castle," has been accomplished with the minimum of friction.

In order to appreciate the delicacy of the work of this Service you must keep in mind the fact that our army is operating in one of the most densely populated and highly cultivated countries in the world where every foot of land is utilised and nothing is wasted. No one realised this sooner or better than General Pershing himself who, as early as August, 1917, issued a General Order which contained the following injunction:

"The intense cultivation of the soil in France and the conditions caused by the war make it necessary that extreme care be taken to do no damage to private property. The entire French manhood capable of bearing arms is in the field fighting the enemy. Only old men, women and children remain to cultivate the soil. It should therefore be a point of honour with each member of the American Army to avoid doing the least damage to any property in France. Such damage is much more reprehensible here than in our own country. Those who may offend in this respect will be brought to trial under the 89th Article of War, and commanding officers will see that prompt reparation is made under the provisions of Article 105, even though the damage does not exceed a single franc."

The Service is in charge of a General Director, Colonel John A. Hull, the Judge Advocate, while there is a Chief Requisition Officer, Lieutenant Colonel H. T. Klein, and also a Chief Claims Officer, Lieutenant Colonel Robert Burkham, who are all lo-

cated at Tours—the Headquarters of the Services of Supply. The work in the field is divided into various sections each one with a Section Officer. Our friend the Zone Major operates in connection with these officials. With each Division of the American Army there is also a representative of the Service known as the R.R. & C. Officer.

The Renting is of course a very simple matter of temporarily acquiring property by lease and involves a bargain mutually satisfactory to lessor and lessee. It is when you get into the complicated matter of Requisitions that you strike the first snag. The American Army requires thousands of buildings of all kinds from barns to immense docks and warehouses. The French property owner is no more anxious to have his property taken for public use than the average American citizen would be. If the American has any political pull he will use it to the utmost to avoid having his establishment commandeered. So, too, with the French.

In order to facilitate this work the French Government has granted to the American Government the right to requisition French property in the event that a satisfactory lease cannot be obtained. It is an extraordinary instance of the confidence that one national administration reposes in another and the very consciousness of this power has been a tower of virtue for all American officers. It means that they will go to the very last limit of patience and forbearance to avoid employing this weapon. The co-operation between the French Government and its citizens is

such that the voluntary lease is the rule and the requisition is the exception.

The infinite detail attached to voluntary leasing can be understood when I tell you that the enlargement of one Training Area alone involved the acquisition of fifteen hundred separate pieces of property. But this was an infant performance compared with the proposition that faced us in the securing of the land for the largest Base Supply Depot. It is eight square miles in area and eighteen thousand parcels were involved. This could only happen in a country like France where the farmer is able to work a miracle with a square yard of earth.

Wherever property is acquired by lease or otherwise the value of the crops and the damage to the land must be estimated together with the determination of a proper compensation for occupancy. The method of procedure in the more important cases is to ask the French Mayor to call the various property owners together. The matter is explained by the American Officer in charge of the negotiations who expresses the desire of the United States Government to deal fairly with the land-owners. It not infrequently happens that after amicable adjustment has been reached a farmer will say as the matter is concluded: "If my country can trust our Allies so can I."

With the Department of Claims you touch French human nature at its most sensitive spot for you invade the purlieus of the pocket-book. The A.E.F., like the B.E.F., has discovered that a damage claim is a Frenchman's middle name. Since this Section investi-

gates and settles all claims for injury to persons and property caused by actions and omissions of American soldiers its docket is pretty full. They include claims for damages to billets, land, persons, and claims arising out of theft, depredations, fires, acts of war or by A.E.F. vehicles. Congress wisely decided that they should be paid in accordance with the French military law and practice.

The Chief Claims Officer has authority to settle claims amounting to not over 10,000 francs, while the Section Officer's authority extends over claims which do not exceed 500 francs in amount. The Zone Major's authority is limited to claims of 250 francs or less. Claims involving not more than 100,000 francs must have the approval of the Commanding General of the Services of Supply while claims amounting to over 100,000 francs are approved by the Commander-in-Chief of the A.E.F.

The great majority of claims are for comparatively small items which never fail to amaze the American soldier. What seems to be a trifling injury, such as tearing out of a manger in a stable, is a real and vital loss to the frugal French peasant whose lot this last four years has not been an easy one. Besides, lumber is extremely scarce in France and very difficult for the farmer to obtain. Furthermore, the French peasant does business on a very small scale and since the beginning of the war most of the land cultivation has been done by women, old men and young boys.

Hence the flood of small claims that almost unin-

dates the R.R. & C. involves items that would almost be regarded as a joke by the American farmer. Among the claims for small injuries are for broken window-panes, injury to paint, broken plaster, and door-knobs. Not an infrequent cause of complaint is the loss of a key. The removal of this highly-useful but not entirely indispensable article is never overlooked. The French peasant, however, regards a key as important and valuable as a title deed to his property; a state of mind, I might add, that is entirely shared by the owners of French hotels. I have known of a hotter row being kicked up over the loss of a key in a big French hotel than over the theft of a thousand dollars in America.

Injury to French land involves two separate and distinct causes. One is damage resulting from the immediate necessities of war—the so-called “*faits de guerre*”—for which no compensation is paid, and injury which comes about in the natural course of careless event. Of course human nature, no less active with the French than any other nationality similarly placed, is very apt to ascribe all losses to the second cause and therein lies the most frequent subject of controversy. Indeed it is extremely difficult sometimes to convince the Frenchman that whatever has happened to his goods or his chattels was the fault of the god of War instead of the god of Man.

A unit was once encamped on a farm near the front. Its mules were picketed nearby. Suddenly and without warning a number of German shells dropped on the camp. The animals were turned loose and they

beat a retreat that was more strategic than orderly. Being by nature destructive beasts, they took the shortest cut to the rear, which happened to be through highly cultivated gardens and orchards where they played havoc. With great difficulty the farmer was convinced that the unfortunate action was an act of War and therefore he could receive no compensation.

The real humours of war are found in these French claims for comparatively small damages. A well-meaning cow died from eating camouflaged grass meant to deceive the Hun but not the unsuspecting herds of France. Her owner filed a claim which proved that the beast was an innocent bystander of War and which was paid. Another cow attracted by the remnants of grass on a bombing range allowed either her curiosity or her hunger to get the better of her animal discretion and died as a result of eating the grass, which had been poisoned by the contents of the grenades used on the range. She was also put into the innocent bystander class.

All damage by American student aviators who are now flying all over France and who have sometimes to descend unceremoniously in a field under cultivation, are paid by the A.E.F., as are claims for the considerable injuries resulting in the Training Areas from trench-digging, bomb-throwing, rifle-practice and also practice with machine-guns and heavy artillery. The French have come to the conclusion that our horses and mules are highly discriminating when they go out to pasture, because they always select the best gardens and orchards. This straying into fertile



fields proves to be rather an expensive item for Uncle Sam.

Fires constitute a large and important part of the work of the Army Claims Agency. The reason is interesting especially when these fires happen, as they often do, in billets. The French fireplaces have been successfully used for hundreds of years but the Frenchman's fire is a very different thing from the American's fire. These tiny French hearths were never constructed for the fires which the average American likes and builds. The net result is that they start such a roaring conflagration that the whole house is involved. The investigation of a French fire is a most elaborate ceremony. Among the documents which must be produced are the title papers to the property, the insurance policy, the birth certificate of the property owner and the contract of marriage upon which the property rights to the wife may depend.

No branch of the R.R. & C. Service, however, is confronted with more complications than that which deals with the investigation and settlement of claims for damages done by American vehicles to citizens and property on the streets and roads of France. Compared with our highways the average French street in the small towns where many of our troops are quartered is an alley. The French citizens regard it as an inalienable right to walk in the street rather than on the sidewalk. Quite naturally they come in more or less frequent painful contact with the heavy American trucks that are constantly on the move. The

doctrine of contributory negligence which frequently is a complete defence in America does not obtain in France. Hence we have many street accident claims to pay.

The French have a high sense of appreciation of our justice and generosity in this matter of damage claims. Let it be said to their credit that they sometimes do not present a bill of injury. Not long ago the following letter was received by the Commanding General of the Services of Supply from a father whose daughter had been injured by one of our big motor trucks:

"In the name of my daughter, victim of an accident caused by an auto truck in the service of your army; in the name of her late husband who died for France with decorations by order of the army; of his daughter and my whole family; considering the correct attitude and considering the painful position of the military auto-driver, under the strict lash of military discipline, I have the honour to plead in his favour for your kind indulgence.

"After the pain and suffering resulting from the accident which I hope is only temporary it will be profoundly painful to us to think that a brave soldier who came to defend us, may be punished severely for an act for which he is not to blame.

"Trusting in your kindness, commander, will you receive kindly the assurance of our high regard."

All this difficult work requires a highly specialised training, partly legal but mostly human. In order to secure the necessary personnel a school has been established at Tours to equip men for the R.R. & C. Serv-

ice. It is held in a whitewashed room in the old French Barracks. More than one student bears on his right sleeve the chevron that proclaims "wounded in action." Typical of the contrasts that war creates this institution is in charge of a former lecturer at the Harvard Law School. Stranger still is the situation which daily finds American officers, lawyers by profession, sitting as quasi courts in equity throughout France and administering French laws to French people so that justice shall prevail. In this war—as in no other—everything is possible and nothing is surprising.

When posterity makes its appraisal of the American effort in France no detail will probably come in for a larger degree of wonder and admiration than the immense amount of construction reared by these alien hands in a foreign land. The A.E.F. has been a Master Builder. The whole task of army construction comprises a branch of the American Business of War that expresses American energy and enterprise to a degree not surpassed in any other Service of Supply. Uncle Sam is a Boss Contractor and on a stupendous scale. He runs a building business precisely like any of the great construction corporations in New York or Chicago. The only difference is that while a private concern must solicit trade, the A.E.F. gets all it wants without the asking.

At the head of this work is Brigadier General Edgar Jadwin, Director of Construction and Forestry, whose office in that now-famous quadrangle at Tours is the nerve-centre of the army building that ranges from

the construction of an immense dock at a Base port up to the erection of a temporary storage shed in the Zone of the Armies. Under him is an army of more than 100,000 men, including thousands of foresters. He could build a fair-sized city almost overnight; no specialised task from a bakery to a cold storage plant is outside the capabilities of this host which toils with hammer and saw with the same fidelity as the man who fights with guns. In a previous article I told the story of some of the achievements registered by the army engineers. It only remains to show the business side of the organisation which is a striking lesson in centralisation.

Despite the myriad construction enterprises constantly underway throughout France there is a "follow-up" system which keeps track of every undertaking. In what is known as a File of Projects, General Jadwin maintains an up-to-date record of all work under way. Each piece of work is on a separate sheet and whether it is a dock, warehouse or hospital he can tell at once how far it has advanced and what remains to be done. This results from the fact that his Service is charted from Director down to a gang cutting timber in a far-away forest. He has a Chief Engineer in every one of the Sections in France. Each Chief has his own organisation, which is a link in the army Construction chain. If a dock is to be built in Base Section Number One the plans and specifications are sent to the Chief Engineer of that Section who is charged with execution. It is up to him to see it through. He makes daily and weekly reports of



BRIG. GEN. EDGAR JADWIN



BRIG. GEN. M. L. WALKER



COLONEL W. J. WILGUS



BRIG. GEN. G. VAN HORN MOSELEY

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progress, which enable the Director to keep his File of Projects live. When I was in Base Section Number Two exactly one thousand projects of one kind or another were under way.

This Project File, however, is only one detail in the plan of organisation. The whole scheme of army construction is visualised on the huge Map of Construction which hangs in General Jadwin's office and which shows every piece of work under way. Each kind of job is indicated by a colour. A hospital is indicated by a tan square; a railway yard by a white one; a Supply Depot in straw; a Camp Site in blue; an Aviation Camp in red, and so on.

In the same way each type of work has its own chart. What is known as the Hospitalisation Chart is one of the marvels of system. It shows in waves and in thousands of beds (all hospitals are built in terms of bed-capacity) how the enormous system of American Hospitalisation in France is expanding by leaps and bounds. A line in blue, for example, shows the bed space available in Base hospitals and hotels; green indicates the bed space in camp hospitals, while mauve locates hospital buildings under way. The A.E.F. follows the rule of having ten hospital beds for every hundred men oversea. Our hospital construction, or Hospitalisation as it is known, is so standardised that we build in regular units of a thousand beds and have been known to erect three or four of these in a single day.

All construction plans and specifications with the exception of those for Railway Transportation are

prepared by a large force of draughtsmen which is part of the staff of the Director of Construction and Forestry. The plans for railway projects are drawn under the direction of the Director General of Transportation, for whom General Jadwin acts as Consulting Engineer.

This mighty construction not only requires an army of toilers but an immense amount of lumber. This brings us to the second phase of General Jadwin's work. Obviously it is impossible to transport the millions and millions of feet of timber from the United States. Tonnage, as you have learned, is the supreme problem of the A.E.F. and must be utilised for material that cannot be obtained abroad. The army therefore decided to produce its own timber by cutting it in France. This has led to the organisation and development of a complete Forestry Service which is mobilised with the same scientific care as any other branch of the army.

In the Forestry regiments you can find "lumber jacks" who have made the chips fly in the forests of Wisconsin, Maine, Washington, Michigan, Oregon, Louisiana and Alabama. They are a hardy, seasoned, weather-beaten, competent lot and have rendered a service comparable to that of the locomotive engineers and firemen who left cabs and tenders on the American systems to drive the army iron horses in France.

By arrangement with the French Government we have acquired nearly two hundred French forests where you can hear the zip of American saws and the



rattle of the machinery of portable American saw-mills that have been brought to France "knocked down," and set up wherever they are needed. One of these saw-mills cut 20,000 feet of lumber in ten hours. A battery of five of them cut 120,000 feet in two ten-hour shifts.

All these forests are obtained by what is known as the Acquisition Section of the Forestry Service. The French have a peculiar affection for their trees and they are the best foresters in the world. It makes them weep to see the magnificent stretches of woodland sacrificed for army use. But, as a Frenchman said to me in discussing this matter: "We would rather have our forests cut down scientifically by the Americans in the cause of freedom than to have them permanently blackened and destroyed by German shells." So great is the French regard for their forests that a group of French foresters accompanies each American Forestry gang and marks the trees to be cut. These groups of trees are known as *coupés*, which is the French for trees to be cut. Every American who works in a French forest in conjunction with the French experts will go back home better equipped for his job if he expects to be a woodman. No better propaganda for the conservation of our natural resources and more especially our forests can be imagined. You get some idea of the significance of this forestry work when I tell you that we need or will need for twelve months more than one billion feet of boards. Already we are cutting 30,000,000 feet a

month and the number of our saw-mills is rapidly nearing the one hundred mark.

Construction is only one consumer of army wood in France. The army must be kept warm, which means that for the twelve months between July 1st, 1918, and June 30th, 1919, the Quartermaster Corps—which provides fuel for the A.E.F.—will require 1,250,000 tons of cord wood. One cord equals two tons. The wood for fuel is cut under the direction of the Chief Quartermaster and at the time I write is being done in the Advance Section by more than ten thousand men who include nearly two thousand civilian labourers; the others are American soldiers.

A study of the American Business of War would be incomplete without a look at that highly necessary detail in the conduct of a corporation, which is the pay roll. In addition to many war-born distinctions Uncle Sam has become one of the largest employers in the world with a box-office second to none. Although the doughboy has no worries about the High Cost of Living so far as France is concerned (he is fed like a fighting cock) he likes to have money in his pocket and his grateful Government sees that he gets it promptly no matter if he is fighting at the front or serving in the rear.

The principal army disbursing in France is done under the auspices of the Chief Quartermaster, who pays all troops except those in the Engineer, Signal, Medical, Ordnance and Air Services. He also provides the money for billets, for subsistence, clothing and gasoline bought in Europe and for the rental of

the French telegraph wires that we lease. The Chief Disbursing Officer, Lieutenant-Colonel C. B. Eckels, handles more money than most big banks. Although he deals in millions he never sees any of the actual cash. In September alone the amount of money that passed through his office represented more than \$100,000,000. Of course this money is not sent from the United States. A very simple system of exchange of national credits makes it possible for us to always have available funds.

Every American soldier is paid in the money of the country in which he is serving and in cash. If a doughboy in France is unmarried, carries no war risk insurance and has not subscribed on the instalment plan for a Liberty Bond, he gets \$33 a month, or, based on the rate of exchange at the time I write, 188 francs and 10 centimes. Wherever a soldier has allotments, whether for family, Liberty Loan or insurance, this amount is first deducted from his pay and he gets the proceeds. The men are paid once a month by so-called Disbursing Quartermasters. If a man is ill or wounded in a hospital the money is brought to him.

With pay as with everything else the American soldier gets the benefit of the last word in army convenience. This means that recently we have introduced a new and compact Individual Pay Record Book which is a substitute for the old-time and cumbersome army pay roll which the men had to sign. If he were wounded or lost he frequently missed his pay for several months because there was no accessible record of what he had hitherto received. The new

pay book, which must be carried by the soldier on his person all the time, eliminates this hardship. In it is recorded every payment made to him and it is likewise a complete history of the owner together with his family financial obligations if he has any.

This book is patterned after a similar one carried by the British Tommy. It lacks one detail of the model, however, in that it has no blank space on which the soldier may make his will. Thousands of British troops have written their last testament within sound of the guns and just before going over the top in that little blank space which is so often their farewell indited message on earth.

The American army pay book is a great deal more than an up-to-date ledger of the soldier's income. The record of the automatic withdrawal of the allotments for wife or mother is a constant reminder of obligation to family, while the equally systematic payment of his instalment on the Liberty Loan is a kindred stimulus to financial responsibility to his country and his flag. It begets a sense of thrift and saving that, like so many other war experiences, becomes a constructive precedent for peace.

The army pay book is just one of many first aids to the soldier's physical and economic convenience. Just as a Store on Wheels goes to the man in the trenches so does a Travelling Adjuster visit units in the field in the interests of War Risk Insurance. The psychology of this is interesting. The nearer a man gets to the Zone of Death the more apt he is to want to protect his family in case he is killed. A bursting

German shell, therefore, is the best possible "selling talk" for a War Risk Insurance policy.

If a soldier wants to continue his studies in France he has an opportunity to enroll in a Field University which is being equipped with \$5,000,000 worth of text-books and which will have a thousand instructors from American schools and colleges. If he is unnaturalised he does not have to wait until a bullet makes him an American by adoption. By signing a paper he can become a full-fledged citizen of the U.S.A. No matter what branch he is in, he can get the special news of it served up in the official organ of that Service. The Engineers have a monthly magazine called "The Spike"; the Motor Transport Corps publishes a periodical named "The Steering Wheel"; while the Transportation Department has unfurled "Rails and Sails" to the breeze. To complete this array of army publicity is the Stars and Stripes—the official newspaper of the A.E.F.—which gives the American Business of War what has come to be an essential annex of every well-regulated corporation—a Press Agent. Unlike the wicked corporation, however, it needs none.

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## XII—*System Unto Death*

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THE extraordinary system that accounts for all things in the army from a can of food to a five-ton truck renders a kindred and ultimate service with each little sepulchre of glory that dots the fields of France. Here is an act that reaches across the sea and touches the hearts and homes of all America. Since no soldier's body can be transported to the United States until after the peace treaty is signed, the care of the overseas graves becomes a matter of supreme responsibility. Through a supervision that combines tender solicitude with minute detail nearly every square yard of French earth "with a richer earth concealed" is marked and can be identified when the Pilgrimage of Remembrance begins.

Our grave registration is perhaps the most difficult in the war for the reason that while the British, for example, operate in a compact area in France our men are in the line from the English Channel to the Vosges. They have been thrown in the battle-front at unexpected times and places and everywhere they have christened the ground with their good red blood. The complicated and sometimes hazardous labour of finding and marking these graves is entrusted to what is known as the Graves Registration Service, which has fulfilled a sacred obligation with a fidelity that

will give this all-necessary detail of war a whole new distinction in the days to come.

The direction of such a task demands not only real organising genius but sympathy and understanding as well. All these qualities are happily embodied in Lieutenant Colonel Charles C. Pierce, who is the Chief of the Service. This big-souled, kindly man has cheered the aching hearts of bereaved American wives, mothers and sweethearts ever since the first Philippines campaign took toll of our troops. He went to Manila as an army chaplain. He soon found out that saving families from the agony of suspense about the location of the graves of the loved-ones was as important as saving souls, so he devised a scientific system of accurate identification and registration. When we were ready to establish a similar service in France he was the logical choice to organise it.

Although its function is as sentimental as it is gruesome the Graves Registration Service is organised precisely like any other branch of the American Army. Colonel Pierce, who is part of the Quartermaster Corps, is at the apex of the pyramid which outlines every detail of its work from the acquisition of cemeteries to the photographic record of a lonely grave somewhere on the fringe of battle. The G.R.S.—as the Graves Registration Service is called for short—has nothing to do with the burial of the dead (this is done by Burial Squads with the army), but it takes up the work the moment that the grave is filled. It registers and inspects graves; corresponds with relatives and friends of deceased soldiers, conducts a liai-

son with our Allies in all matters of mortuary interest, and, what is most important of all, maintains such a complete and accurate record of every soldier's grave in France that when the war is over it can be easily located.

To do this, Graves Registration must have the co-operation of the armies in the field. It begins with the individual soldier. Every officer, private and civilian attached to the A.E.F. must wear two aluminum identity tags. They are about the size of a silver half-dollar and of a suitable thickness and must be worn suspended from the neck underneath the clothing by a cord or thong passed through a hole in the tag. The second tag is suspended from the first one by a short piece of string or tape. In the case of officers these discs are stamped with the name, rank, regiment, corps or department of the wearer and the letters "U.S." If a man is an aviator his tag would bear the words "U. S. Air Service." Many officers wear a metal identification plate attached to a chain around the wrist. With private soldiers the tags are simply stamped with the soldier's name and the letters "U. S. A." on one side and the army serial number on the other. In the British army the religious faith of the soldier is indicated. C.E. stands for Church of England and R.C. for Roman Catholic.

When a soldier is killed in action the burial squad is required to bury one of the identification discs with the body and place the other in a bottle or attach it in some way to the temporary marker over his grave.



This marker is usually a so-called "peg" on which the number of the soldier is written with a hard black-lead pencil. All burial units carry pegs or wood crosses on which the serial number is written. The permanent marking of the soldier's grave is an olive drab cross bearing an aluminum plate showing the soldier's name and number.

If all soldiers were killed where proper time and care could be exercised in marking their graves the task of registration would be easy. But troops fall in the heat of battle inside and out of the enemy's trenches, in No Man's Land, and on spots that remain under fire sometimes for days and weeks. They are often buried where they fall and frequently they are not allowed to sleep their last sleep in peace. More than one grave has been churned up by an exploding shell which destroyed every mark of identification. The job of Graves Registration is not to reinter that body but discover some clue which will restore the lost identification. The methods adopted are many and unique. A soldier whose grave has been destroyed by shell fire has sometimes been identified through a process of elimination which meant the checking up of hundreds of last resting-places. Again a coin or a keepsake found in the grave has been associated with its one-time owner. The G.R.S., however, regards no toil too arduous to establish the identity of a dead soldier. It knows that for every bit of effort expended in France there is a corresponding world of gratitude in a saddened home somewhere in America.

Registration of graves involves no small degree of danger. In the Zone of the Armies the G.R.S. Units follow closely on the heels of the burial parties of the combat troops, registering and verifying the temporary markings of all graves, searching for and burying bodies that have been overlooked, and regulating and organising the battleground cemetery which rises so often and so sadly almost overnight on the hillsides and in the valleys. Some of these Registrars develop an uncanny instinct for locating unmarked graves. I have known them to stop suddenly on the road and after a swift glance at a field nearby that gave absolutely no sign of a grave say, "A soldier is buried out there." Ask how they know it and they will tell you that it is determined by a variety of reasons which may be a slight depression in the ground or the appearance and formation of the soil.

After every battle an offensive is launched for the dead precisely like the one launched for the living. It is composed of the Advance Groups of the Graves Registration Service. Each one consists of an officer and ten men. They deploy a skirmish line to find out if any grave or bodies have been overlooked. They work under shell fire and perform a service that is both heroic and holy. I can pay no higher tribute to what they do than to reproduce part of a Letter of Commendation about one of them—it was in charge of Second Lieutenant Homer B. McCormick—which was issued by special direction of General Pershing. The official account of the particular performance is as follows:

"On April 20, Lieut. McCormick and his Group arrived at Mandres and began their work under heavy shell fire and gas, and although troops were in dug-outs, these men immediately went to the cemetery, and in order to preserve records and locations, repaired and erected new crosses as fast as the old ones were blown down. They also completed the extension to the cemetery, this work occupying one and a half hours, during which time shells were falling continually and they were subjected to mustard gas. They gathered many bodies which had been first in the hands of the Germans, and were later retaken by American counter attacks. Identification was especially difficult, all papers and tags having been removed, and most of the bodies being in a terrible condition and beyond recognition. The Lieutenant in command particularly mentions Sergeant Keating and Privates La Rue and Murphy, as having been responsible for the most gruesome part of the work of identification, examining every body most thoroughly, searching for scars or tattoo marks and where bodies were blown to pieces, these men were especially particular to make minute examination, regardless of the danger attendant upon their work. This group of men was in charge of everything at Mandres from the time the bodies were brought in until they were interred and marked with crosses and proper name plates were attached."

As soon as a man is killed in action his death is reported by telegraph or runner by his immediate Commanding Officer to the Adjutant of the unit, who in turn sends it to the Adjutant General of the A.E.F., who supervises the preparation of the Casualty List—the Roll of Honour. No casualty is reported, how-

ever, until the official grave location is received. This is due to the fact that men missing and reported dead for days or weeks sometimes show up in time or have been captured by the enemy. The Service, therefore, takes every precaution to prevent a premature notice of death being sent out.

The system of grave location becomes a highly important part of Casualty Intelligence. When a grave is properly marked a so-called Grave Location Blank—made out in duplicate—is sent to the Graves Registration office. It shows the name, rank and number of the soldier; the place of burial; the grave number; whether the grave is marked with a peg, headboard, cross or bottle; the disposition of the identification tag and any other remarks. This Blank must be signed by the chaplain who officiated at the burial or some other officer present. One copy of this Blank goes to Graves Registration and the other to Central Records for its Master Card Index of the A.E.F. The permanent record of the grave is put on a card which contains the army history of the soldier; where he died; the nature of his wound; how he was identified; the number of the Casualty Cablegram in which his death was officially reported; his next of kin, and the disposition of his personal effects. A special Effects Depot, in Base Section Number One, assembles the property of all men killed and transmits it to their families.

Not content with making certain that every grave is properly located and registered, the G.R.S. performs still another kindly service in the shape of a letter

written by Colonel Pierce to the next of kin as soon as the location of the spot is definitely known. It conveys the assurance that the six feet of French earth specified will be cared for during the war and until there may be further disposition of the remains. That this army thoughtfulness is not without its grateful appreciation is shown by the hundreds of letters that have been received. Out of them I select one which reached France just before Memorial Day, 1918, and which shows what a patriotic American father thought of Graves Registration. Here it is:

"My dear Sir:

"Your kind and sympathetic letter in regard to my son's death, burial and grave location was received yesterday. Your letter is a great support to me and it is good to note the absence of caste in our American Army. Your letter gives the tone of a true comrade, soldier and American. My son was all I had—he and I were pals. I shall take his place in an appropriate position as soon as I can.

"I am enclosing a check for ten dollars and ask you to place such flowers on his grave as you can. I would like a lily if you can get one (he always bought a lily for my birthday on April 12). If you have any money left use it for the graves of some of the boys who have no fathers to send checks.

"Respectfully yours,

"P. S. Will you please put a card on the flowers for Memorial Day, saying that they are from Dad and Mother."

The thoughtfulness of Graves Registration has no more concrete expression than in the special provision

for marking the graves of the Hebrew dead. In no instance is a cross used. If only crosses are available the horizontal piece is removed and the name plate or number is attached to the perpendicular section or standard. The prescribed marking for Jewish soldiers is a square headboard which is carried on the regular list of Quartermaster supplies. When you know this you feel certain that if any Mahometan should die in the service of the A.E.F. he would be laid away with his head towards his beloved East!

The army system which knows neither friend nor foe carries its tender ministrations to the enemy dead. Whenever it is necessary for the A.E.F. to bury a German or an Austrian a section of a military cemetery is utilised. A report of this grave location is made just as in the case of an American. The indications of rank and service are reproduced in German as well as English. The location of these graves is conveyed to the German authorities through the American Legation at Berne, acting with the Red Cross.

One more picturesque detail will illustrate the thoroughness of Graves Registration. Whenever a grave is "isolated," which means that it may be outside a cemetery, in some obscure French burial-ground or in a detached field, a sketch is made of it and becomes a part of the location records. I have seen scores of these sketches. They are so minute and accurate that a child could find the grave by having the diagram in its hand. If the grave is near a road the sketch will not only show the road and adjacent territory but will specify that "a group of firs is six feet away." On

another sketch I saw this direction: "The grave is fifteen feet from the road and under a shell hole in a stone wall." Arrangements have recently been completed for a photographic record of every American grave in France. It will be done under the auspices of the Red Cross. Such elaborate supervision means that the percentage of "unknown" American dead in this war will be smaller than ever before in history.

The efficiency of the A.E.F. obtains even unto death: Greater love than this hath no army.

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### XIII—*Business Managing War*

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**W**HEN the real story of the Great War is written and some dispassionate appraisal is made of the causes of victory it will be found that the laurel of civilisation's triumph will rest with no single nation. It was not the unspeakable sacrifice of Belgium, the incomparable heroism of France, the dauntless courage of the British, the blithe daring of America, the fortitude of Italy, or the well-nigh forgotten Russian resistance of the early days. Rather was it the co-ordination of all this superb effort expressed in the Unity of High Command at the front, coupled with no less flexible and compact Unity of Supply in the rear, that made the achievement possible.

To this unification, which must stand out as the really determining factor in the war (Germany did not begin to crumple up until the Foch Consolidated Hammer began to strike) America has contributed her full share. Nor is this surprising. Co-ordination is simply another name for that larger standardisation of efficiency and product which epitomise her industrial genius. It became one of her overseas aims the moment she became a full-fledged partner in the Business of War and had an army in the field. With this Business Managing of War, as it may well be



called, we will conclude our survey of the American Supply System in France. Through some of the precedents it has established we will not only be able to cope with the immense problem of demobilisation but assume intelligently the new economic responsibilities which will come with the daybreak of world peace.

The scheme of co-ordinated Allied supply is really due to the foresight of the Commander-in-Chief of the American armies in France. Like most admirable institutions it began at home, which means that it was practically born in the A.E.F. The American Army had to be adequately supplied before it could fire a shot. Such a supply demanded a stupendous shipping and at the outset we had few ships. Tonnage, as I have often pointed out in these chapters, was the supreme problem of the A.E.F. from the beginning. Every effort had to be bent to relieve the strain on it.

One definite way was to procure everything possible abroad. It necessitated the establishment of a huge purchasing agency which would co-ordinate army buying and become a vital link in the whole supply chain. This has been done and on a truly American scale of scope and action. When I tell you that up to November 1, 1918, we had purchased 8,400,000 tons in Europe you realise what this organisation has done in bulk alone. But this is not all. Every ton of material bought in Europe means that a ship ton of 40 cubic feet is saved for men or supplies that must and can only be brought from the United States. Multiply this 8,400,000 times and it

becomes quite evident that without the purchasing agency we have set up, the whole American war participation might have been seriously impaired. Through its Labour Bureau it secured, maintained and militarised an army of 47,000 civilians in Europe, Asia and Africa, which was another tonnage saver. It has been the silent submarine-fighter. The story of the world-wide machine that it has created, the fortitude and resource of the business men in khaki who operate it, and the constructive and co-operative influence that it has exerted upon the conduct of the war, comprise a fitting finale to the panorama of the Services of Supply of which it is a part, and which has passed in review before you.

Army purchase began in France the moment that the first American Expeditionary Force landed. Obviously it could not carry all the supplies it needed and hungry men and beasts cannot wait. In addition, our first Engineering units arrived practically without tools. It meant intensive purchasing, which has kept up on an increasing scale ever since.

As the overseas force expanded this buying which began by scattered units was done by organised Services. Each Service has its Purchasing Officer. The inevitable happened. So urgent was the demand for supplies of all kinds that these branches of the army were soon in commendable but costly competition with each other. When the Quartermaster Corps priced a quantity of material, for example, and returned in a few days with the necessary authority to buy, it discovered that the Engineers had already absorbed it. The

evil went further because the French business man, being human, stimulated this competition and raised his price accordingly. The French army, in turn, felt the effect of this competition and a serious situation developed.

No one realised this more swiftly than General Pershing, whose grasp of business detail and instinct for standardisation are almost uncanny. He saw that while every ton we bought in Europe aided the whole shipping programme, the purchase of that ton must be orderly and constructive. In August, 1917, he authorised a General Purchasing Board composed of the Purchasing Officers of the various Services and with a General Purchasing Agent at the head. This Agent was to be the representative of the Commander-in-Chief in *liaison* with the various Allied purchasing agencies and charged also with the co-ordination and supervision of all purchasing agents in the A.E.F.

The problem was to find a business man in the army with sufficient financial and commercial experience to attach himself to a desk and organise this all-important work. It required vision, executive ability, and the power to handle difficult situations arising out of negotiations with foreign governments. Fortunately a man of this calibre happened to be wearing the uniform of an officer of Engineers in France. He was the then Lieutenant Colonel, and now Brigadier General, Charles G. Dawes, who had been Comptroller of Currency under President McKinley and who had worked his way from humble station in an Ohio town to be president of one of the leading Trust Companies

in Chicago. He expressed the highest possible capitalisation of business brains for the Business of War. When we went to war with Germany he sought active service. Having been Chief Engineer of a small railway in the Middle West in his early days, he obtained a commission in a famous Engineer regiment which was one of the first to arrive in France and which has left its impress in docks, railway construction and Supply Depots.

General Pershing knew General Dawes when the latter was a practising lawyer in Lincoln, Nebraska. He had followed his admirable career in the army so he installed him in Paris as General Purchasing Agent. He began in a small room in the Hotel Sainte Anne which was then the Headquarters of the American Army. To-day his staff and the associated organisations not only occupy the largest hotel in Paris but have representatives in nearly a dozen different countries. Thus with Purchasing—as with every other detail of American Supply—you get the now familiar miracle of an almost unprecedented expansion.

When you examine the work of the General Purchasing Agent and the General Purchasing Board—they are two separate and distinct propositions—you find that they parallel for war the same system of organisation observed by a huge corporation in peace. Let me illustrate with the case of the United States Steel Corporation. If every one of its subsidiary companies purchased raw material, machinery and general supplies on its own and in the open market the overhead cost would be excessive on account of the lively



BRIGADIER GENERAL CHARLES G. DAWES  
*General Purchasing Agent, A. E. F.*

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competition. Instead, the corporation established a Chief Purchasing Agent who buys for the whole institution. All requirements are submitted to him ahead of time; he anticipates needs, and gets the best possible product and price. It is centralised buying. This is precisely what happened with the A.E.F. The "G.P.A."—as the General Purchasing Agent is called—and the "G.P.B.," which is the General Purchasing Board, do all the overseas buying for our armies through a system that is a marvel of co-ordination and result.

The General Purchasing Agent occupies a peculiar yet distinct position. Although every dollar's worth of material that we buy outside of America is purchased under his authority he does no buying himself. The buying is done through the heads of the Purchasing Departments of the various Services who constitute the General Purchasing Board and who maintain, as a result, an independence of purchase. They purchase by category, that is by specific lists of items, and the process is therefore known as Categorical Purchasing. The General Purchasing Agent, however, acts as a general co-ordinator of all this buying. He approves although he cannot initiate purchase. He likewise exercises the full power of veto which is the check on excess, extravagance and conflict with the interests of our Allies.

Whether in France, Switzerland, Spain, Italy, Holland, Sweden, or Portugal the General Purchasing Agent, through his representative in that country, becomes the outpost and the scout for supplies. He

locates horses, digs up raw material, discovers machinery, secures options on crops. The actual buying of all this, however, is done by the representative of the Service for which it is intended acting under the G.P.A. representative's supervision. This procedure is expedited—you must step lively in war buying—for the reason that an officer of each Service is attached to every foreign branch of the G.P.A. In such a transaction, therefore, the agent of the G.P.A. acts as Co-ordinating Officer. The great bulk of our overseas buying, however, is in France where an explanation of the system reveals the whole working of an organisation which is second to no Allied Business institution geared up to the needs of the war.

In order to get a comprehensive view we must begin in the office of General Dawes in the Elysée Palace Hotel which is the Headquarters of all A.E.F. purchasing activities. Every American who has visited Paris in recent years will at once appreciate the picturesque significance that attaches to the use of this hotel for war purposes. The imposing stone structure, which occupies a full block on the Champs Elysées, was the favourite stamping ground—so far as Paris was concerned—of the beauty, chivalry and royalty of Europe before the war. Here King Leopold of Belgium maintained a suite. In the foyer dukes, diplomats and stage favourites mingled in gay and festive array.

Vanished are all these social splendours. Where once the champagne glasses clinked you hear the rattle of American typewriters; in the gilded dining room



whose no less gilded price lists nightly punctured the pocket-book you find a Board of Accounts pruning army pay-rolls; in those splendid chambers which rustled with silk and reeked with perfume American business men wrestle with contracts, while the marble bath-rooms, once the wonder and admiration of the French capital, are the repository of card indexes. One of the smartest hotels in Europe has become the humming counting room of an animated branch of the American Business of War. It is one more convincing evidence that war, which is no respecter of persons, is likewise the supreme leveller of hotel rank.

Typical of all this denatured splendour is the fact that General Dawes' office is in the stately and panellled salon of what was, in happier days, the Grande Suite. But it is shorn of its trappings and save for the noble ceiling and ornate mantel is just like the work-room of the President of a great corporation. In the centre is the long table where the occasional meetings of the General Purchasing Board—the Directors of this vast Purchasing Corporation—are held. Facing the door and at a simple flat-top desk sits General Dawes while opposite to him is Lieutenant-Colonel Nelson D. Jay, who left the Vice-Presidency of one of the largest New York Trust Companies to do his share in France.

In this book I have described many charts of army organisation yet none perhaps is more ramified—certainly none embraces such far-flung authority—as the one which bares the operations of the General Purchasing Agent, who is on the administrative staff

of General Pershing. At the apex is the Commander-in-Chief. Linked with him is the Commanding General of the Services of Supply. Tied up with both of these is the G.P.A., from whom radiates such a network of co-ordinated agencies that the chart looks like the reproduction of an octopus whose tentacles extend everywhere. They bind the A.E.F. up with all our Allies; they extend to every foreign country where we buy supplies; they disclose a succession of compact, scientific and highly-organised bureaux that do everything from standardising accounts to setting up insurance against after-the-war investigations. To analyse them in order is to dissect a system that could audit, manage, and safeguard the fiscal interests of any huge American corporation no matter how large.

The Control Bureau will aptly illustrate how the organisation works. At the head is Lieutenant-Colonel Francis E. Drake whose long contact with Big Business in Europe equipped him to deal with the many problems that Continental war-time buying develop. Associated with him is a group of American business men, most of them long residents of Paris who left lucrative posts to give army buying the benefit of their varied experience.

The Control Bureau is the clearing house for all American army orders. They flow in to the extent of several hundred each day from the Purchasing Departments of the eleven Services that buy everything from rails to trucks. Not only must every order have the approval of the General Purchasing Agent but all orders involving amounts in excess of \$1,000 must

have the additional approval of the French Government. Hence the bureau maintains an intimate and constant liaison with the French Government which is one of the most interesting and constructive phases of its work.

Every Service in the A.E.F. gets—and it will continue until the army leaves France—what is known as the Forward Requirements of its various units. By Forward Requirements is meant future needs. These Requirements are transmitted to the General Purchasing Agent who consolidates them. He likewise co-ordinates all demands for certain standard commodities. If, for example, the Quartermaster Corps, Ordnance and Engineers all need shovels the whole army need of shovels is unified in one requisition and the buying is done by the Engineers. This saves labour and enables the army to buy in larger quantities and get the benefit of such purchasing.

Orders for food, timber or leather require slight supervision. If they involve the use of metal—as the great majority of them do—they are caught up at once in a drastic scrutiny which not only shows Franco-American supply co-ordination at its best but unfolds a process of close-knit business administration that will have its effect long after the last shot of the war is fired. This brings us to the Metal Control Office whose task is to scrutinise the amount of metal required for the manufacture of articles for American army use. Installed as Metal Controller is Captain Charles E. Carpenter, who had been a brilliant and successful machinery expert in Paris in civil life.

He allots all metal for A.E.F. use. If the needs of the different Purchasing Departments exceed the available supply he distributes the material in proportion to the need.

The moment you touch metal you touch one of the most zealously conserved commodities in France. The reason is quite obvious. In the first flush of her war successes and when she came down from the North like a "wolf on the fold" Germany acquired by conquest more than eighty per cent of the iron and steel producing capacity of France. A metal crisis at once developed. The French war industries became dependent to a large extent for their raw supplies upon other countries. Much of this material had to come from the United States and therefore became a part of the eternal tonnage problem. Before we entered the war it was not so serious. Just as soon as we began to manufacture munitions for our own use the French metal situation naturally became more acute. Every ton of iron or steel diverted to a non-essential use not only meant the loss of this material to war necessities but likewise wasted a ton of valuable shipping. Hence the French Government wisely established a rigid control over the supply of all raw materials and mainly metals.

The advent of the American Army in numbers made the metal situation more serious because we began to place orders in France for machinery, tools and other articles that used steel and iron and which could not be shipped from the United States because we needed the tonnage for men and food. This constantly in-

creasing employment of the manufacturing facilities of France taxed output and raw material. The Control Bureau therefore submits all American orders involving metal to the French who not only act as censors of price and probity of contractors but practically allot the French material to be used.

Our orders involving metal are sent twice daily to what is known as the Inspection des Forges, where a corps of French experts, familiar with every detail of manufacturing, makes a rigid examination with the twin view of protecting both governments and preventing any waste of precious metal. This Inspection des Forges is one of the many constructive instruments developed by the war and because of its inevitable influence with peace is well worth an explanation. Before the war it corresponded to the Inspection Division of the United States Ordnance Service in that it inspected raw material for guns and also the finished product. It operated in four districts, which were Paris, Toulouse, Lyons and Nantes. With the outbreak of hostilities France immediately converted it into an agency for the procurement of raw materials and machinery necessary to war industry. It resulted in what the name implies—a literal inspection or control over every forge in France. It has branches—or Detachments as they are known—in all the smaller cities and through them exercises an incessant supervision of the whole iron and steel industry of the Republic.

The Control Bureau has a Liaison Officer,—Captain John H. Weare, a steel man of long experience—

constantly at the Inspection des Forges. Just as soon as an American Army order arrives it is analysed. Many essential requirements must be met. Since it involves a contract with a French manufacturer the first step is to find out if this particular firm or individual is on the Black List, that is, if it is excluded from dealings with the French Government. Then comes the examination of the amount of metal required and the relation that it bears to the distribution of the limited supply of raw materials in France. The third item is the all-important question of price, since it is neither the desire nor the interests of the French Government that the American army be charged more than the French consumers. The final qualification is the ability of the contractor to fulfil his obligation within the time limit prescribed. All this information is readily accessible to the Inspection des Forges because its hundreds of inspectors are constantly in touch with the manufacturing establishments in their districts and know to the quarter of a ton what the plant capacities are.

If the order and the contractor meet requirements the approval of the Inspection des Forges is stamped on it and it returns to the American Control Bureau for the General Purchasing Agent's approval. Once stamped with his visé the contract makes one more journey to another Department of the French Government to be examined with regard to the possibility of its interference with similar work being done for the French armies. If no conflict is established it

receives the final O.K. and goes to the contractor for execution.

This scrutiny shows that there is little chance for the profiteer to get in his nefarious work. Wherever evidence of attempted extortion is found the French Government takes the matter in its own hands and requisitions the material or merchandise on the account of the army. This close team-work resulting from a double examination of orders by both governments prevents competition between the two armies. When there is a limited supply of certain articles it insures equitable distribution between them.

The probe that the Inspection des Forges applies to all American contracts has "smoked out" many a profiteer to the eminent satisfaction of the French authorities. Just as soon as a French contractor arouses the suspicion of this admirable agency of conservation life is summoned to Headquarters and is put through the "third degree" by the French that disgorges everything. Particular attention is given to middle men or men who handle army contracts as a side line. The American army contract has been the means of rendering conspicuous service in uncovering overcharges, as leading officials of the Inspection des Forges gleefully informed me. Upon one occasion a Parisian entered into a contract with the A.E.F. to provide a certain number of hacksaws. The contract went through the routine mill and reached what well might be called the prosecuting attorney of the Inspection des Forges, who, smelling a mouse, summoned the contractor to his presence. It developed that he was a

dealer in pearls who was handling hacksaws as a side line. The price he had made for them gave the French the impression that he still believed he was dealing in precious stones. Not only was he deprived of the contract but the French Government put him on a list where he could do no further extorting.

The generous co-operation of the French Government with our army has no higher expression than, in the work of the Inspection des Forges, which has saved the United States infinite anxiety, time and money. This institution, however, is not only the watchdog of war-time product and pocket-book but it will be a bulwark of French industry after the war and a vital instrument with which to combat German industrial aggression. It can be developed into a tremendous rival of the celebrated German *Metall Gesellschaft* which, with the *Allgemeine Electricische Gesellschaft*—the Teutonic Electric Machinery Trust—was on the point of dictating terms to the Continental metal industry when the war interfered with its mighty programme.

Closely allied with this Metal Control is a kindred control of equal importance. With more than three-fourths of her iron and steel resources in the hands of the Germans, France faced a serious problem in filling orders for the American army. She was perfectly willing to help us out and relieve the strain on shipping but she had to have the wherewithal to produce the goods. To this end an arrangement was entered into by which we transport raw material from the United States and parcel it out to the French fac-



tories. The intermediary is the Bureau of Reciprocal Supply which is part of the General Purchasing Agent's organisation.

Although this operation requires a considerable tonnage the commodities into which this material is converted would require a good deal more. Experience has proved that the bringing in of a single ton of raw material saves from five to ten tons of shipping and, what is equally important, provides for the rapid and uninterrupted procurement of articles in which a scarcity develops. This applies to almost every known product from ash cans to automobile trucks, which are being made every day in France for the A.E.F.

Let us assume that the Quartermaster Corps needs 5,000 ash cans; that the Motor Transport Corps requires 1,000 five-ton truck chasses, and that the Air Service must have 2,000 gasoline tanks and at once. If orders for these articles were placed through the Control Bureau with French firms and with the approval of the French Government it would absorb a considerable amount of raw material necessary for French war industry. By procuring the raw material from the United States the strain on the French sources of raw material is at once relieved and tonnage is saved at the same time.

Here is where the Board of Reciprocal Supply comes in. The French firms who have contracts for these specific articles submit their requirements for the raw material. These requirements are transmitted direct to the War Industries Board at Washington which controls all raw material in the United States.

Washington, through its various agencies, secures the material and ships it to France where it immediately becomes available for American use.

Every day an immense amount of such material arrives at French ports. It must be received, stored, and allotted to the various French industries. All this requires a definite organisation. It would not pay the A.E.F. to build up an institution for this work for the simple reason that the French Government through its control of industry and material already has such a machine in operation. Hence all this material is turned over to the French, who store and deal it out to their industries, who are paid the price fixed by the Government. Again you have an example of the co-operation between the French and American Governments which is both constructive and economical.

As a result of this activity the emergency needs of the A.E.F. are met and many thousands of tons of precious cargo space are saved for necessities that can only be manufactured in the United States. This is particularly true of so-called hollow-ware. A container of any kind as a finished article occupies a considerable amount of room on a ship. When that article is sent to France in the form of a sheet of iron it occupies much less.

The extent to which tonnage saving has been carried is almost amusing. Let me illustrate with the case of macaroni. The hole in a single stick of macaroni is a very trivial thing, but when you consider twenty or thirty millions of pounds it is not to be despised. Hence we ship flour in bulk from America

and make the macaroni in France. It is good to remember that in tonnage as in everything else, the sum of the small things counts.

No phase of our Purchasing System in France is more significant than that which deals with the procurement of machine tools and for which there is a special Machine Tool Section. Primarily this has been a War of Machinery. When you have studied its economic phases as I have had the privilege of doing for the past four years, you realise the value of a lathe or an automatic. In the early days these machine tools were almost worth their weight in gold. Some of the great American war fortunes were made in them, first because the Allies had to have machinery for shell production, and second because we ourselves went into the munitions business on a large scale and the market was combed out.

America had been so prodigal with the sale and general consumption of her machine tools that when we actually got into the war and needed machinery for our various Services in France we were hard put to secure them. At that time army purchasing was in the first throes of organisation for General Dawes had just taken command of procurement. In order to expedite his work in specialised lines an Auxiliary Advisory Committee composed of leading American business men in Paris was formed. It was of immense aid in securing much-needed machinery, including 6,000 machine tools which were distributed among the Repair establishments in France. Out of this purely volunteer organisation grew the Central Board

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and the Machine Tool Section of the General Purchasing Board. In October, 1918, however, the purchase of all machine tools and small tools was transferred to the Ordnance Service, of which the Machine Tool Section is now a part.

Behind this army acquisition of machinery is the larger fact that every machine tool used for war and which stands up under the strain of incessant wear and tear, will be an equally important factor with peace when the world will enter upon an unprecedented era of industrial competition. The more machinery we acquire now, especially in France where we will be compelled to establish industries to hold our own in the great commercial game, the better prepared we will be for the titanic after-the-war trade struggle.

Our army purchasing abroad is not without its element of stirring interest. So unromantic a need as a freight car has taxed ingenuity and afforded an example of Yankee enterprise that fits into the great story of American war supply achievement. Although we have a succession of car shops in France there is always an immense demand for freight cars. A large car-building concern in a neutral European country had a contract with a French Railway for a thousand cars. The bodies had been built but the contract remained unfilled for the reason that between the time the agreement was made and the time of delivery approached, the price of steel advanced tremendously. The Company wished to increase the contract price and the French Railway declined to meet it. As soon as the General Purchasing Agent learned of this sit-

uation he bought the bodies, rushed wheels and axles from the United States and our transportation system overseas was a thousand cars to the good.

On another occasion there was a pressing demand for railway ties. It was before our sawmills got into action and prior to the arrangement with the French for the use of their forests. One of the scouts of the General Purchasing Agent located an immense quantity of ties in a neutral country, got them on a ship and landed them at a French port in record time.

When the German hordes overran Belgium, the railway authorities of that unhappy country had the foresight to run five or six hundred locomotives into France under their own steam and save them from falling into the clutches of the Hun. It was long before the great American Moguls began to arrive and we had to have engines. General Dawes heard of these Belgian locomotives and acquired them. To-day you can see them, with American engineers at the throttle, hauling long trains of freight cars marked "U.S.A." all over France. I cite these incidents to show how the long arm of American army acquisition has reached out everywhere and obtained needful supplies without drain upon the Transatlantic Bridge of Ships.

This imposing array of actual commodities garnered in many lands and under varied conditions only comprises one branch of American army purchase abroad. We now reach a detail of it that has tested our resource and skill to the limit. To study it we must leave the domain of the concrete and deal with

an intangible thing, which is power. It had to be acquired in precisely the same way as guns or trucks.

Fully to comprehend the extent of this problem you must understand that the A.E.F. is engaged in an immense industrial activity in France. We have enormous car and locomotive erection and repair shops; we build tanks; reconstruct motor transport; salvage endless equipment; occupy hospitals almost without number; operate docks; roast and grind coffee and manufacture chocolate. All this requires power and every Service clamours for it. How do we get it?

Instinctively you would say: "Why not obtain it from the French?" This is easier said than done for the reason that war industry made an enormous demand upon the French electric power supply, while extensive expansion has been greatly retarded by the scarcity of men, due to the calling up of millions of men to the colours. Our wheels had to be kept turning. The provision of power became a vital matter and its procurement was put up to the General Purchasing Agent who, like our old friend G4—the Army Co-ordinator—is the repository of requests.

The General Purchasing Agent met the emergency by establishing what is known as a Technical Board, one of the many activities under his supervision. The executive head of this Board is Lieutenant-Colonel Francis E. Drake, who as Chief of the Control Bureau is the Chairman of the Technical Board. The active head, however, is the Chief Engineer, Major Dugald C. Jackson, a widely-known Consulting En-

gineer with much experience in public utilities in America and who was a member of the faculty of the Boston Institute of Technology. Associated with him from the start has been Captain Albert B. Cudebec, a specialist in hydro-electric construction and who, with Major Jackson, was one of the pioneers in American army power production in France. Gradually they have assembled a group of more than forty engineers who in civil life built dams and irrigation projects and installed power plants from the Atlantic to the Pacific. The Technical Board is a sort of Congress of Experts who, in the face of almost innumerable obstacles, have furnished the "juice" to drive the army's many-sided industries.

Since it was extremely difficult to get complete new power plants from America the Board set about to develop and adapt existing French power establishments to the American needs. Wherever an uncompleted French power station was discovered American construction gangs were put to work to complete it. Every possible makeshift was employed all to the end that power be secured. The General Purchasing Agent learned that some Swiss turbines intended for Russia had not been shipped. They were immediately secured and installed by American Engineers in a French power station. Our purchasing representatives scoured all Europe for installations. A complete plant was discovered in Portugal. In less than sixty days it was driving machinery up in the Advance Section.

The technical knowledge required for all this adjusting and adapting frequently had to be supple-

mented by tact of the highest order, for the reason that these undertakings involved rival French commercial interests who were jealous of their prerogatives and who had to be reconciled to the larger obligation that both France and America were being served by this expansion. With power, as with railroads and docks, this dynamic Americanisation is helping to change the face of the country. Small communities that lacked public utilities are now enjoying the heating and lighting advantages of large cities.

The Technical Board is on the job day and night and it has met emergencies with a degree of swiftness not surpassed on the firing line. Here is a concrete story which will show the kind of propositions that are put up to it. On September 17th, last, Major Jackson received the following telegram from G4 at Tours: "Get 3,000 kilowatt plant in Europe." It was intended for immediate and urgent use at a large Base port that we are using. You get some hint of the extent of this order when I tell you that this plant was of sufficient power to provide electric service for a city of the size of Roanoke, Virginia, or Haverhill, Massachusetts. Within a week a plant had been located in England and in a month it was installed in France. The Supply Cities have had no monopoly on army wonder-working.

A huge map that hangs in Major Jackson's office at the Elysée Palace Hotel gives a comprehensive idea of the Empire of Power that we have helped to develop in France. We use power in exactly three hundred and twenty-eight localities. Each one of these



installations is shown in a concrete way. The master colour for steam generating plants is green, while hydro-electric service is in blue. Whenever the service is all-American the indication is surrounded by a red circle. In addition to this every army activity has its own colour. An orange square denotes a bakery; a black square a salvage depot; a green and white square an aviation centre; three white squares reveal a tank building plant, and so on.

This American-developed power area means a great deal more than driving machinery in A.E.F. bakeries, salvage depots, air service stations and machine shops. It has a significance for peace not to be overestimated. Combined with the utilisation of water-power, which is incorporated into our general power scheme, an immense section of France is likely to be diverted after the war from agriculture to industry. The brilliant imagination of the French has caught the spirit of what adequate power means. In this inevitable evolution you see one of the many permanent results of the advent of the American army.

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## **XIV—*The Balance Sheet***

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**I**F all our army buying in France had been done in a definite and orderly manner through forward requirements and under circumstances which permitted the drawing up of stable contracts the task of economic demobilisation would be comparatively easy. Unfortunately, this has not been the case. Millions of dollars' worth of food and supplies had to be bought in the early days under the stress of emergency which knows neither haggling nor inspection. We had to have the stuff; the French and British saw that we got it, and the matter of reckoning was left to the then dim and distant date when, with victory assured, inventories could be made.

We were not long in France before we realised that the American Business of War, like the American Business of Peace, required a good lawyer. We did what any corporation would do and installed a Bureau of Contracts and Adjustments which added another and highly useful section to the constantly widening organisation of the General Purchasing Agent. Once more the army took toll of a big business brain because Franklin W. M. Cutcheon, a prominent Wall Street attorney, who had specialised in financial law for years, left his desk in New York to take charge of what was nothing more nor less than the Legal De-

partment of the American Expeditionary Force. He was commissioned a Captain, but his conspicuous if unspectacular service in disentangling the almost endless kinks in our fiscal relations with our Allies has raised him to a Lieutenant-Colonelcy. The net result is that Colonel Cutcheon occupies very much the same relation to the army abroad that Elihu Root bore to the American Tobacco Company and Francis Lynde Stetson to the United States Steel Corporation. In other words, he keeps the army out of legal morasses and helps in no small way to pave the way to an orderly adjustment of our international relations when the war is over.

When Colonel Cutcheon took hold in January, 1918, he faced a well-nigh staggering proposition. It was no man's fault but the fault of the great god War. Practically all the first purchasing of the A.E.F. was done in haste. The contracts were verbal and therefore indefinite. The French Government had met the situation promptly by allowing us to get supplies at cost. Hence in many instances there was no fixed price. Britain displayed the same generosity. When the bills began to come in there was naturally no way to check up. First of all, there was a lack of data about deliveries. In those first days we did not have enough officers to go round and Sergeants had to act as Quartermaster Lieutenants and receive goods. Many of them have been shifted; some have been killed; others have gone home. We had to begin to straighten out our financial affairs and the job be-

came part of the work of the Bureau of Contracts and Adjustments.

The first attack was launched against the mountain of unpaid bills, involving many millions of francs and covering items that ranged from gasoline to guns. The Board did what any Court would do in the case of a promissory note. If evidence was lacking it became a matter of good faith. Wherever receipts for delivery were unavailable the word of the French Government was taken. The financial decks were cleared and an era of economic administration began. Henceforth every voucher for purchases had to have the receipt of delivery attached, a French or British certification which, with the United States Government check, concluded the transaction.

Every army contract of importance must have the approval of the Bureau of Contracts and Adjustments. This work, however, does not end when the contract is signed or even executed as this incident will show. A French butcher made a contract at a Base port to furnish the American Expeditionary Force with 5,000 pounds of fresh beef every day. After he had begun to carry out the terms of the contract the price of meat went up. When he submitted his first bills he increased his price accordingly, although it was not the contract price. The Commanding General of the district approved of the transaction, but the Disbursing Officer declined to pay, contending that the strict letter of the contract had to be fulfilled. The matter was referred to the Bureau of Contracts, which, after a careful investigation, de-

cided that the butcher, who was a man of excellent character, had no intent to gouge and was therefore justified in what he did, and the bill was paid. This is a typical example of what the Board is constantly called upon to do.

The Board also deals with all claims other than those involving damages. The A.E.F., for example, may make a contract with a French quarry-man for a large amount of stone; the man may be delayed so long in installing his machinery that the material must be procured elsewhere. The quarry-man, however, has a justifiable claim for compensation based on his expenditure for a new plant. It is no uncommon case.

So, too, with the many claims of the Allied Governments. In these transactions Colonel Cutcheon acts precisely as a negotiating lawyer would act down in the financial district in New York when two great corporations are putting through a big deal. He is both lawyer and business-man. Typical of the complications that arise in these matters is an episode that relates to the British. As is now well known, a number of American Divisions were sent to the British army last summer partly for intensive training and partly for combat. Although they were equipped when they arrived in France, they had to use British machine guns, rifles and ammunition. In addition, the British had to transport, feed and house them and provide laundries. It was not difficult to figure out a basis of settlement for actual new equipment, but the matter of land and sea transport was more complicated. The British frankly admitted that they did

not know how to appraise and charge, so a "capitation" rate of a certain sum per head per day for each American soldier was agreed on.

The work of the Bureau of Contracts and Adjustments will continue long after the last American doughboy has waved farewell to the shores of France. On it will depend some of the harmony of our whole future relations with the Allies. This observation brings us to still another wing in the organisation of the General Purchasing Agent which is engaged in a task no less vital to our permanent friendship with the great peoples with whom we have fought and bled. I mean the Board of Accounts which was a natural development of the stream of fiscal items that literally poured into the G.P.A.'s office.

The reason for the existence of a Board of Accounts requires no diagram. With eleven Services buying supplies every day; with almost continuous financial transactions with Allies and neutrals involving half a dozen different kinds of money; and finally the necessity for a prompt winding-up of all these relations as soon as possible after peace, the need of fiscal centralisation and standardisation is obvious. The Bureau of Accounts, therefore, is charged with rendering a consolidated account of all A.E.F. expenditure. This means that it must mobilise, classify and itemise all vouchers and make up a Master Account for the War Department at Washington. It is a control and record bureau rather than an operating institution. Its work is to create a machinery that will make the path to economic army demobilisation easy.

Such a work requires the most highly specialised direction. It was found in the person of Major C. H. Holloway, who in civil life was a member of one of the largest expert accountant firms in New York. With him as junior officers are men with similar experience who have been invaluable assets in this all-important labour which, with the end of the war in sight, is just beginning.

In analysing this work you again face the many complications arising out of our advent in France in unexpected numbers and the emergency commercial relations that had to be established with our Allies. In war every step is costly either in human life or in money. In times of great stress when the newspapers are filled with the accounts of great advances and the conduct of the conflict is a matter of every-day necessity the cost is seldom reckoned. But when the smoke of battle clears and peace is on every tongue the words "Settle up" have a far different meaning. The "overhead" on glory must be reckoned coldly and in cash. The A.E.F. went to France prepared to pay for what it got and the Board of Accounts is making it possible to find out what it owes, and will owe when the end has come.

"Why didn't the army pay as it went?" you may ask. Simply for the reason, as I have pointed out earlier in this article, that emergency knows neither haggling nor orderly transaction. The payment for actual purchases made in the normal course of war event is a simple piece of book-keeping. But when you come to appraise, for instance, the value of a

forest and the basis on which it is to be restored after the war, it becomes a matter of pure speculation.

Here is another case. An emergency arose through which the A.E.F. required many thousands of French horses. These beasts had to be acquired through a swift census of the farms of France. There was no time for dickering. Big guns had to be moved; we got the horses, and the bill will be rendered later.

Still another instance of this inevitable financial "hangover" arises out of our joint occupation with the French or British of various sectors in France. Our units have been thrown temporarily into various districts where they purchased supplies and incurred other fiscal obligations. Almost before there could be an orderly process of accounting they were shifted elsewhere. Adjudication had to wait for serener times.

This is why an immense amount of unpaid obligation confronts us with the cessation of hostilities. In addition to the instances I have already specified it applies to the use of the French railways, the lease of locomotives from the Belgian Government, the rehabilitation and occupation of plants, quarries and hospitals, and the undetermined debts in neutral countries. So much for our debit.

On the other hand we have established a considerable credit for we have provided our Allies with quantities of supplies that they were unable to obtain themselves, more especially food, fuel and metal stores. Frequently these supplies have been issued in the field and were recorded on scraps of paper or anything that



would hold pen and ink. The task of the Board of Accounts is not only to consolidate these various debits and credits, but establish a series of standardised forms which makes inter-allied financial transactions simple and easy.

The way "deliveries" to Allied forces has become a matter of systematic record will explain what has been done. Every officer in the field who issues supplies to the French, for example, is provided with a book in which the issue is recorded in quadruplicate. All instructions are in both English and French. The original and duplicate are signed by the Allied Receiving Officer and returned to the American Delivering Officer, who keeps one and sends the other to the Board of Accounts. The triplicate copy is retained by the Allied Receiving Officer, while the fourth goes to the French Government. Thus all parties to the transaction have a definite record. In addition, the back of the book contains a form, also to be made out in quadruplicate, for the whole month's transactions. This is only one example of standardisation of form. It is being extended so as to cover every phase of inter-allied army negotiations involving money. A standard form has been made out to "bill" the British and French Governments that is a model of completeness and detail. All this means that when the time comes to balance the great Book of War there will be a definite and orderly basis of settlement. When you polish off the financial rough-spots you go a long way towards establishing harmony. In war or peace,

money, or the lack of it, is the usual root of most evil.

This standardisation of accounts will perform still another vital service for peace. It will enable the various Governments to know their war obligations in advance of that great day when the armies come marching home. This means that they can arrange for additional loans and taxes and help to adjust the tangle of foreign exchange which, unless anticipated, may be one of the economic sore spots in the epoch of world rehabilitation.

The subject of money naturally leads to the Financial Requisition Officer—Captain Raymond Ives—who is the custodian of the strong-box of the A.E.F. His office is one of the smallest in the Elysée Palace Hotel, yet the army can do no business without him because he holds the purse strings. The Disbursing Officer of each Service—in the main they pay their own bills—issues checks against deposits in the branches of the American Trust Companies that are the accredited depositories in Paris. Every afternoon each of these Companies renders Captain Ives a total of all the army checks drawn on it the day before. He in turn gives them a check on the Bank of France to cover the amount. Uncle Sam maintains a generous credit in this great national financial institution.

In this daily check-up you find the application of a rule in operation in every well-conducted corporation. It means that the army has no idle and inert money lying around loose in the French banks, as was the case before our system became organised. Instead,

our funds are liquid and at work. If you want to get some idea of what war costs I have only to add that the disbursing requirements for the A.E.F. for October, November and December are exactly 2,693,139,-185 francs, or \$538,627,837.

The average reader need scarcely be told that all this ramified buying, which must go on long after the armistice is signed, and which involves hundreds of millions of dollars and many thousands of articles of every-day use, must have a background of vital statistics. Sir Eric Geddes, First Lord of the British Admiralty, and a Master Doer, once told me that the secret of success, in the Business of War or in the Business of Peace, was summed up in the sentence: "Statistise everything." The General Purchasing Agent does this very thing. Hence the Statistical Board is an essential instrument of co-ordination of war work which, as you will presently discover, is performing a definite service for peace. It was built up by Major J. C. Roop, now at other work, and is in charge of Major Joseph Willard Krueger, who has audited construction accounts all the way from the Philippines to the Malay States, and who was on the Board of Valuation of the Inter-State Commerce Commission when he cast off mufti for the army khaki.

His main job is to classify and compile the consolidated lists of quarterly forecasts of the army purchases. It involves an examination of every order for commodities and materials authorised by the A.E.F. He gets the similar forecasts of the British and French armies in France "for the purpose of

comparison, standardisation and control." In simple every-day language this means that he must prevent duplication as far as possible. To achieve this desirable and economical end he has, with the co-operation of Lieutenant Donald des Granges, a Boston architect in civil life, instituted a work that will make a definite and permanent contribution to the stabilisation of international trade. It reveals a picturesque condition developed by the war.

Every Service in every Allied army uses nearly every known kind of tool, especially in its Supply domain. Each Service, however, has a different name for the same article. Ask an Englishman for a monkey-wrench and he thinks you are talking about natural history; speak of a frog, which is a portion of a railroad switch, to a Frenchman and he at once assumes that you mean one of his favourite articles of food. When you see a bunch of inter-allied army orders you are apt to find eight or nine different titles for the same thing. Let me illustrate with a common saw. In making requisitions the Air Service calls it a hand cross-cut saw; the Engineers know it as a cross-cut saw; Motor Transport knows it as a hand saw; Construction and Forestry orders it as a wood saw; while the Salvage Service indicates it as a carpenter saw. It makes for confusion.

The Statistical Bureau is making a giant card index or a Vocabulary as it will be finally known, that standardises the name of every article that armies will use. The specific item of saws that I have just used shows the urgent need of it. In the Vocabulary

all ordering will be made for a hand saw. The British and French will have a copy of this index and will know precisely what the Americans want, while the Americans in turn will be able to fill the needs of the Allies in the same intelligent way.

This Vocabulary will have an immense significance after the war when orderly trading between nations will develop at a tremendous rate. One of the greatest drawbacks hitherto in international business relations has been the difficulty of different peoples in making one another understood. The Vocabulary, therefore, becomes a dictionary for world commerce and will be one of the many constructive contributions that War will make to Economic Peace.

The work of the American army in France both at the front and in the Services of Supply could never have achieved its results without perfect liaison with the French and the British. Since our armies have operated in France and have bought, and will keep on buying, the bulk of their supplies from the French, this series would be incomplete without a brief explanation of how *liaison* works. I can impress its value no better than to quote what an American General in France once said in connection with it. His remarks were:

"I wish earnestly that two vital points be once for all brought to the minds of all American officers; one is that liaison is nine-tenths of the battle; the other is that two minutes of personal conversation are worth more than a ream of correspondence."

Liaison as applied to the army is the connecting link

between inter-allied forces. At the Headquarters of the Services of Supply, for example, there is a so-called French Mission which represents the authority of the French army. All negotiations with the French must be made through that Mission. Attached to every Service, large or small, is a French Liaison Officer. When any matter arises that requires French intervention or co-operation it is referred to him first. In the Elysée Palace Hotel is a considerable French Mission which acts as the intermediary in all matters of purchase and which stamps the final French approval on all American orders for goods bought in our Sister Republic.

Sum up the work of the fiscal activities that flourish under the banner of the General Purchasing Agent and you find that they write a consolidated insurance policy against post-war investigations and scandals. Long and costly experience has shown that it is not war itself that digs the graves of reputations but the official inquiries that come afterwards. When peace finally broods John Jones of Oshkosh or anywhere in the United States who bought a Liberty Bond may, and probably will, demand to know how his money was spent in France. Thanks to a standardised accounting system and a recorded "follow-up" of supplies to the point of consumption he will be told to the last dollar. The balance sheet of the American Expeditionary Force will be as clean as the consciences of the gallant men who registered their heroism on the field of battle.

It only remains to speak of the significant co-

ordinating agencies that supplement the Business Managing of War and rear the unbroken bulwark of Allied Supply. Chief among them in many respects is the Military Board of Allied Supply which is wholly American in conception.

After the momentous decision was made for military unification of the Allied front under the supreme command of Marshal Foch, General Pershing made the proposition to the Allied Governments last April that it was absolutely essential to match this with a military unification of the rear. He made a general request for an immediate consideration of the matter. He appointed General Dawes, then a Colonel, to represent the A.E.F., while M. Clemenceau named M. Loucheur, the French Minister of Armament, to consult and suggest a plan. They jointly devised a scheme for co-ordination which was discussed at two conferences. M. Clemenceau presided at one of them.

The result of these international conferences was to demonstrate again the enormous difficulty so often encountered throughout the entire war of securing agreement between large bodies. In his great desire to secure military unification of the rear General Pershing authorised General Dawes to state to the inter-allied conferences that if it could not be accomplished otherwise he would relinquish the command of his own rear in favour of either a Frenchman or an Englishman under a plan of consolidated authority. Finally, realising the necessity for quick decision, General Pershing, without waiting for a conclusion of the inter-allied conferences, submitted a plan to M. Clem-

enceau which they jointly signed. He then sent General Dawes to England to see Lloyd George and Viscount Milner, the British Secretary of State for War, to secure the acquiescence of the English Government. After General Dawes's explanation of the plan the English Government, through Viscount Milner, formally accepted it.

The plan, as finally adopted, provided for the co-ordination of the rear of the three armies by means of a Military Board consisting of one officer from each army. The President of this Board is Colonel Charles Payot, who has been in command of the rear of the French Army for the last three years, and is considered one of the ablest officers in the allied armies, Major General Reginald Ford represents the British Army and General Dawes by nomination of General Pershing represents the American Expeditionary Force. The Italian Army in France is represented by General Merrone and the Belgian Army by Major Cumont.

The complete record of the formation and accomplishments of the Military Board of Allied Supply or, as the French term it, the Comité Interallié des Ravitaillements, will afford one of the most illuminating studies of both the difficulties and the enormous advantages of allied co-ordination and will shed a new light upon the strong character and broad vision of the American Commander-in-Chief.

The Military Board of Allied Supply only represents one angle of the extraordinary team-work between the Allied Governments which brought Ger-